

**A CLASSIC MODEL IN A LOW FERTILITY CONTEXT:
THE PROXIMATE DETERMINANTS OF FERTILITY
IN SOUTH KOREA AND THE UNITED STATES**

A Dissertation

by

CHRISTINE ELIZABETH GUARNERI

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 2010

Major Subject: Sociology

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ABSTRACT

A Classic Model in a Low Fertility Context: The Proximate Determinants of Fertility in
South Korea and the United States. (May 2010)

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John Bongaarts' proximate determinants model of fertility has accounted for over 90 percent of variation in the total fertility rate (TFR) of primarily developing nations and historical populations. Recently, dramatically low fertility rates across the globe have raised questions regarding whether this model could be applied to exclusively below-replacement nations. This study follows Knodel, Chamrathirong, and Debavalya's 1987 analysis of fertility decline in Thailand by conducting in-depth case studies of the proximate determinants in two low fertility countries over time: South Korea, where fertility is well below the level of replacement, and the United States, where fertility has hovered around replacement level for many years. Then, the fertility-inhibiting effect of the proximate determinants is assessed by comparing the quantitative index representing each determinant measured in the 1960s/1970s with its measurement in the 2000s. For both years, I consider the fertility level that would prevail in the determinant's presence as well as the level that would exist in its absence. Finally, I use

each of the indices to calculate the TFR and assess how the strength of the model varies over time in the two countries.

Ultimately, results indicate that the proximate determinants model does not offer a clean picture of the fertility level in either South Korea or the United States; when trends uncovered by the case studies are compared to the results of the quantitative analysis, a number of inconsistencies are revealed. This suggests that certain components in the model may need to be respecified for more effective application in low-fertility contexts. However, that is not to say that it offers no insight into fertility at all or that it is no longer a useful tool. On the contrary, it is shown that the proximate determinants model holds a lot of potential for analysis in low-fertility nations. The implications of these results, as well as the need for improvements in international data collection efforts, are also discussed.

ACKNOWLEDGEMENTS

This dissertation is the product of a vast support system to which I owe a great deal of thanks. First and foremost, I would like to acknowledge my sister, Lori, who originally suggested that I look into attending graduate school. Without the little push that gave me the impression it would be the most natural thing in the world for me, I may never have considered the possibility.

To the rest of my family, especially my brothers Kevin and James, I thank you for never once wavering in your support of me. Mom, Dad, and Marie: thank you so much for all the prayers and for being a constant source of strength.

To my committee, Dr. McIntosh, Dr. Valdez, and Dr. Fossett, I offer thanks for all the honest feedback and direction. In particular, I would like to thank my committee chair, Dr. Poston, for five years of encouragement and inspiration. Your enthusiasm for demography was what first attracted me to the subject, and having you as a professor was easily the best part of graduate school.

I would like to thank Rachel for everything: for the opportunity to go through the program and this entire process together, for always knowing exactly how I felt no matter what, for understanding jokes without any explanation, and for a myriad of other things it would take pages and pages to list. Imagining us at graduation together was seriously the greatest motivator in the world for finishing this dissertation.

I would like to thank Jackie and Ryan for hours of fun during what would have otherwise been the most awful couple of years ever. Nights of *BSG* and *Doctor Who*

were just what I needed to get through the rest of the week. Jackie, thanks especially for teaching me how to study away from my desk and, subsequently, saving me from losing my mind.

To Sarah, I offer thanks for always being so confident that I would get everything done—and done perfectly, no less—that I couldn't help but believe you. Even though we've been far apart during these past five years, knowing that we can always rely on each other has been really comforting.

I would like to thank Sarita and Chris for always being there when I needed you—whether it was just to hang out, to watch really bad TV, to pick me up when my car was towed, or even to store food in your fridge at 3 in the morning. Basically, thanks for helping me keep my head on straight during these crazy years.

To my Census Aggies, Bethany and Lindsay, I'd like to thank you for providing a wonderful network of support out here in D.C. Knowing we've all been struggling with the same things and can count on each other has really been a blessing.

To all my other friends and colleagues at the U.S. Census Bureau—especially Dave, DeeDee, Jennifer, Jason, Sarah, Laura, Mark, Nate, and Irene—I offer my sincere thanks for your patience and willingness to listen to me alternately obsess and complain about my endless data hang-ups and weekend writing marathons. I promise that I will try to stock up on more interesting conversation pieces from now on.

Finally, to Jonathan: I honestly could not have done this without you. Thank you for your support, for virtually putting your life on hold while I finished this degree, for all the delicious meals you made to keep me going, for all the extra chores you did when

I wouldn't leave my desk, for all the sacrificed weekends, and for putting up with me at my absolute craziest. I am convinced you put husbands everywhere to shame, and if I can be half as invaluable while you finish school, you will be in great hands.

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CHAPTER I

INTRODUCTION

For the latter part of the previous century, the worldwide “population explosion” took center stage. Popular media stories of the baby boom in the countries of the developed world and uncontrolled and uncontrollable fertility in many countries of the developing world became constant; statistics of record-breaking population growth fed the public’s fears. Policy makers and global activists turned to possible solutions or controls, offering anything they could find to prevent the overburdening of the Earth. Despite these pessimistic overtures, known by some as neo-Malthusianism, it is of particular interest that in 2004, Ben J. Wattenberg published *Fewer: How the New Demography of Depopulation Will Shape Our Future*, in which he identified *depopulation*, not *overpopulation*, as the new great challenge of the twenty-first century. “Birthrates and fertility rates ultimately yield total population levels,” he explained, “*and never have birth and fertility rates fallen so far, so fast, so low, for so long, in so many places, so surprisingly*” (2004: 5; emphasis his). As of 2009, 75 countries were estimated to have total fertility rates below 2.1, the number known as the “rate of replacement,” or the number of babies per woman necessary for a developed, low-mortality society to theoretically replace itself exactly (excluding the influence of migration) (Haub and Kent 2009). Morgan and Taylor estimate that just 3 percent of the current world population lives in countries that have *not* begun fertility decline, noting

This dissertation follows the style of the *American Sociological Review*.

that “once a fertility transition has begun, it does not stop until birth rates of 2 or below have been achieved” (2006: 378).

The consequences of this new demographic reality cannot be overstated: changes in fertility rates directly affect population levels, which have widespread economic, political, social, psychological and environmental implications that easily extend beyond national boundaries. Additionally, the combination of below-replacement fertility and resultant population aging has generated numerous concerns that have not previously been addressed by nations in any detail. For instance, fewer babies imply a smaller population of future workers to maintain the current economic infrastructure, to generate new ideas and technologies to remain competitive in the global marketplace, and to pay into social security programs. The latter is of utmost concern, and is disproportionately called upon to highlight the potential severity of the impending labor shortages now forecasted for a number of developed countries. Without enough babies to replace the population, the key question is who will support current workers when they reach old age? With millions less people, can these societies continue to function?

Underlying such questions is the reality that “no country has transitioned back to replacement-level fertility (for any five-year period) once falling below it” (Morgan and Taylor 2006: 377). Moreover, there is the nagging knowledge that pro-natalist policies have been consistently deemed ineffective. The failure of countries to raise their fertility rates significantly is mentioned throughout the literature: Huguet comments on how a number of countries have tried to stimulate their fertility levels by instituting programs such as those that focus on making it easier for women to have children and/or to care

for an elderly family member, while at the same time maintaining a career. Yet any resulting increases have been “modest to date, and have not reversed fertility declines” (2003: 108). Similarly, Lutz and Skirbekk describe family policies in Europe that are based on an “equal-opportunity rationale and aim to help women combine childrearing with employment” (2005:705). Despite varied forms and applications, they report that these policies have had little or no effect on period fertility in the countries with lowest fertility. Grant declares that “it will take a massive effort to bring fertility back to replacement level,” adding that “industrial nations have had notoriously little success in influencing personal decisions about child-bearing, even where there is some consensus as to desirable family size” (2001: 398).

But why is this? One possibility is that the pro-natalist policies instituted thus far have not effectively targeted the true sources of low fertility in a given country. Fertility rates are affected by a number of distinct and different factors, including sexual behavior and marriage patterns, contraceptive prevalence and use, frequency of induced abortion, and postpartum infecundability. Thus, hypothetically speaking, a country might institute a policy to make day care widely available in an effort to increase the compatibility of having children with having a career. However, it might actually be that a cultural stigma exists against marrying young, resulting in a shorter amount of time during which women can start families, and ultimately a lower number of births across their lifetimes. Such a country might well be more likely to obtain the desired fertility results from a policy addressing that cultural stigma. Making this kind of determination is an area in which much more research remains to be done. If it could be accurately identified *why* a

fertility rate is low or ultra-low, it is quite possible that more effective policies could be put forth.

Concerns such as these call for a more thorough understanding of below-replacement fertility. Because this phenomenon was unprecedented and unexpected by most, it is likely that the standard fertility models applied in the past may no longer be as helpful in the examination of below-replacement fertility nations. This is especially likely when both the pace of decline and variation in the fertility levels across these low fertility nations are taken into consideration (Morgan and Taylor 2006). After all, as Morgan and Taylor explain, “the implications of a TFR of 1.25 are vastly different than those of a TFR of 1.75, as are the potential policy responses to ameliorate the consequences” (2006: 376-377).

With the above and related issues in mind, I became interested in investigating whether one of the most well-known fertility-based models of all—John Bongaarts’ proximate determinants model of fertility—would hold up in analyses of strictly below-replacement populations. This model has been shown to account for over 90 percent of variation in the total fertility rate of a combination of primarily developing nations and historical populations. If this model does not meet similar success when applied exclusively to below-replacement nations then, perhaps, a respecification of the model is in order. Either way, the resulting knowledge could well lead to a better understanding of *why* fertility rates are so low, and of *why* efforts to raise them have been so relatively unsuccessful. If so, it is possible that more effective policies could be recommended. In any case, such an analysis could well provide nations with additional information they

could use to determine how to adapt to their new demographic reality, and which would hopefully contribute to making this process of adaptation less complicated.

Therefore, the purpose of this dissertation is to examine the effectiveness of the proximate determinants model in a below-replacement fertility context. This will be done in two separate types of analyses modeled after the style of Knodel, Chamrathirong, and Debavalya's 1987 study of fertility decline in Thailand. In the first, I will conduct case studies of two of the countries included in Bongaarts' original investigation—South Korea and the United States. By doing so, I seek to identify how the proximate determinants have changed the course of fertility in these countries over time. In each case study I will undertake an in-depth look at the four primary proximate determinants, one by one, at the sub-national level. I will consider, for example:

- ♦ How have marriage trends changed over time in each of these countries?
- ♦ Does most exposure to sexual intercourse occur within marriage?
- ♦ How has the extent of nonmarital sexual relations and its implications for fertility changed over time?
- ♦ What is the proportion of couples unable to bear children due to primary sterility?
- ♦ Are there any reliable statistics on coital frequency?
- ♦ What kinds of lactation data are available in these countries?
- ♦ Has there been a noticeable/significant change in the mean duration of breastfeeding?
- ♦ What is the level of contraceptive awareness in these countries?

- ♦ How reliable are the data on induced abortion?
- ♦ If it is believed that current data underestimate induced abortions, by how much?
- ♦ Are people more/less willing to have had an abortion due to prevailing religious beliefs in these countries?

These questions are among the many I will address in an effort to better grasp the manifestation of each determinant in two very different nations over a thirty-year period. Then, in the second analysis, the fertility-inhibiting effect of the proximate determinants will be assessed by comparing the quantitative index representing each determinant measured in the 1960s/1970s with its measurement in the 2000s. For both years, I will consider the fertility level that would prevail in the determinant's presence as well as the level that would exist in its absence. Finally, I will use each of the indices to calculate the TFR and assess how the strength of the model varies over time in the two countries.

I expect that the results of these analyses will reveal that certain modifications to the proximate determinants model may well be in order. For example, Bongaarts included "proportion married" as one of the four original proximate determinates with the intention of representing women of reproductive age who were engaging in sexual intercourse regularly (Bongaarts 1978). Decades ago, this was believed to be a fairly accurate proxy for exposure to sexual unions and accordingly an accurate determinant of the number of births a woman would have. However, gender norms in many developed countries have changed substantially over the past 30 years and with them general acceptance toward sexual activity outside of marriage. Today, 91% of females in the

United States are likely to have premarital sex before age 30 (Finer 2007).

Subsequently, as the results of my analyses should reveal, the relationship between the proportion of women who are married and the TFR may no longer be as strong.

Essentially, I will use knowledge of this type to theorize how the proximate determinants model might be modified to explain a higher proportion of variation in the TFR of strictly below-replacement fertility nations.

Following this introductory chapter, Chapter II reviews previous literature pertaining to this topic. In particular, it will provide an overview of the following: fertility levels throughout history and the emergence of low fertility as a significant demographic concern; the concept of *replacement migration* and the debate surrounding its potential use in below-replacement contexts; the institution of fertility policies and their effectiveness; the leading fertility paradigms and their potential application to explanations of low fertility; and previous studies utilizing the proximate determinants model. Chapter III will introduce the hypotheses I seek to test, as well as the data and methods that will be employed in each of the two central analyses to test these hypotheses. My dissertation will rely on a variety of data sources including the Population Reference Bureau *World Population Data Sheets* for 2006 , 2007, and 2008; the Population Reference Bureau *2008 Family Planning Worldwide Data Sheet*; the National Survey of Family Growth, Cycles I, II, and VI; the 1974 Korean National Fertility Survey; the Korean 2003 National Fertility and Family Health Survey; the Korean 2005 National Survey on Marriage and Fertility Trends; and many others outlined in this chapter. Chapters IV and V will consist of the two case studies in which

the proximate determinants model is applied to the countries of South Korea and the United States, respectively. Chapter VI analyzes the fertility-inhibiting effect of the proximate determinants in these two countries by comparing the quantitative index representing each determinant measured in the 1960s/1970s with its measurement in the 2000s. Finally, Chapter VI will provide a summary of the results of this investigation, examine their significance, theorize modifications for the proximate determinants model in below-replacement fertility nations, and explore some of the implications for future research.

CHAPTER II

LITERATURE REVIEW

An analysis of the Bongaarts' proximate determinants model in a strictly below-replacement context should include a discussion of fertility levels throughout history, an overview of the concept of replacement migration, attention to the relationship between fertility policy and the level of fertility in a nation, a review of the central fertility paradigms, and introduction to the proximate determinants model of fertility itself. This chapter includes each of these elements.

Fertility Levels Throughout History: An Overview

Over the course of human history, the notion of population growth has been virtually inseparable from the idea of the perpetuation of the species. However, there has been a distinct shift from focusing on growth as the means to avoid extinction to focusing on survival even when levels of growth have been higher than desired. It has been estimated that in 8000 B.C., around 5 million people populated the Earth; this is the point in time at which the earliest farming communities are believed to have formed. By 1 A.D., the global population had grown to approximately 300 million, and then reached an estimated 800 million by 1750. Such growth translates to an average doubling time of greater than 1,000 years (Durand 1967). This is attributed to high birth rates counteracted by similarly high death rates, resulting in a percentage growth rate only slightly above zero. During this period of very slow growth, the effects of famines,

epidemics, and wars were significant and potentially threatening to the overall survival of the species. For example, the infamous bubonic plague of the 14th century accounted for the deaths of about one in three persons across Europe and China (Gelbard, Haub and Kent 1999). Ultimately, sufficient levels of growth were critical to ensure that human societies could persist even in the face of such substantial losses. As Charles Hirschman explains, “without high fertility, most [traditional] societies would have experienced population decline and eventual disappearance” (2003: 425).

It was not until the twentieth century that this focus on the need for population growth experienced the shift from concerns for survival to concerns for self-preservation in light of a perceived “population explosion.” Improvements in public sanitation, hygiene, and nutrition, along with advances in medicine, brought about increases in life expectancy and decreases in mortality. Consequently, between 1750 and 1900, the population of the world saw a doubling time of around 150 years; this dropped to just 65 years between 1900 and 1965 (Gelbard, Haub, and Kent 1999). Whereas the population of the world did not reach its first billion people until 1800, a second billion was added to the population by 1930, a third by 1960, a fourth by 1975, and a fifth by 1987. The six billion milestone was reached just over ten years later in 1999, with 7 million projected to be reached some time before 2015 (McFalls 2007). Such a “phenomenal increase” is attributed in large part to the sharp decrease in mortality rates in the less developed countries that had not yet also experienced fertility decline (Kent and Haub 2005: 4).

It was in the early 1960s, when knowledge of dramatic population growth initially attracted popular attention, that the term “population explosion” became a common household phrase. The general public began to fear for the economy, environment, subsistence of government programs, and the overall quality of life. Popular media exacerbated the issue with its coverage on the baby boom cohort at home, and the high fertility of women in developing countries. In 1968, the renowned American demographer and sociologist Ansley Coale observed that:

Today, after some twenty years of fertility well above the pre-World-War-II levels, it has become fashionable to explain almost every national failure or shortcoming by rapid population growth—the ugliness and hopelessness of slum life, wasteful and irritating traffic jams, unemployment and delinquency among the disturbingly large fraction of adolescents who drop out of school, the pollution of air and water, and the disappearance of the natural beauty of our country behind a curtain of billboards and under a blanket of Kleenex and beer cans (467).

Yet despite this preoccupation described by Coale, a very different kind of population trend was beginning to take shape behind the scenes. As early as the 1930s, certain developed nations, such as the wealthier countries in Europe, had reported fertility rates below the replacement level (Coale 1968). At this initial stage, such declines in fertility were often regarded as short-term fluctuations. Concern over the potential for a declining population was superseded by population momentum which maintained positive natural increase in these low-fertility nations. The Baby Boom experience seemed to provide reassurance that birth rates could, and would, rebound. Many demographers referred back to Demographic Transition Theory (see section below), which held that a sharp decline in mortality was followed by an equally sharp decline in fertility, which would ultimately stabilize at the replacement level (Population Reference

Bureau Staff 2004). Declining fertility was not, so it appeared, a worthy distraction from the seemingly uncontrollable rates of growth beginning to take place in developing countries as their mortality rates—but not their fertility rates—experienced dramatic declines.

Though widely accepted as a reasonable perspective, some individuals voiced dissent. Among them was the prominent American demographer Donald Bogue, who in his President's Address at the 1964 Population Association of America Annual Meeting offered his sincere belief that a “truly tremendous demographic ‘breakthrough’” had taken place (Bogue 1964: 450). He stated that:

Two or three years ago demographers tended to hold the gloomy view that only a small miracle could save many nations from disaster because of rapid population growth. The picture now is completely different. If we make generous use of the world “if,” we now find a basis for a cautious optimism (1964: 450).

In other words, it was his opinion that rapid population growth and overpopulation were not slated to continue on as the most pressing concerns among demographers—in fact, it would likely be just the opposite. Bogue followed this pronouncement with research that revealed a decline in fertility between 1968 and 1975 in many developing nations that was much greater than had been anticipated. With his colleague Amy O. Tsui, he concluded that world population growth was well on its way to slowing rapidly, with zero population growth likely by 2035 to 2050 (Bogue and Tsui 1979). These conclusions were met by many with considerable skepticism (Demeny 1979), and even described as “over-optimistic” (van der Tak 2005: 27). Yet the passing of time has proved his words true.

Globally, the average number of children per woman declined from 5.0 in 1950 to 2.6 in 2009 (Haub and Kent 2005, 2009). However, a closer look at the regional discrepancies within this trend provides insight into how these fifty-nine years were fundamental in shaping the current high fertility/low fertility dichotomy that has characterized the demography of the world at the start of the twenty-first century. Among developed nations, these years coincided with the final stages of the demographic transition: low mortality resulting from significant gains in health and medicine brought about major improvements in life expectancy and infant mortality, and was now being joined by falling levels of fertility. Whereas many of the developed nations had experienced a baby boom following World War II, various trends including delayed marriage, increased rates of divorce, a larger number of women enrolling in college, and higher female labor force participation quickly overwhelmed the boost in births. Accordingly, fertility rates began to decline again by the 1970s. By 1980, many European countries reported fertility rates below replacement, and by 2000 the same could be said for most of the developed world (Population Reference Bureau Staff 2004). In 2009, the average TFR for the more developed nations was 1.6 (Population Division 2009). While the declining fertility itself was not regarded as a surprise, Demographic Transition Theory did not account for such *sustained* low fertility. Subsequently, this continued change has been termed by some to be the “second demographic transition,” though there is disagreement among demographers as to both the ultimate outcome of this second transition, as well as the degree to which a transition

of this kind will become widespread (Population Reference Bureau Staff 2004). That is, will developing countries tend to follow this path?

Among developing nations, the early twentieth century found their fertility and mortality rates in the pre-demographic transition state. In other words, high fertility occurred along with high mortality. However, this trend was not constant across the less developed world. Instead, significant variation existed then and continues to exist in the rate at which these countries have progressed through the stages of the demographic transition, with some exhibiting completely new patterns of change (Population Reference Bureau Staff 2004). Coale has explained that “differences in traditional beliefs and customs appear to play a part in determining whether or not the rate of childbearing falls, in addition to such differences as education and per capita income” (Coale 1989: 22). In most developing nations, fertility has undergone a notable decline, primarily due to the dissemination of contraceptive knowledge and technology on the part of the more developed countries. In the 1950s, the average TFR in the developing parts of the world was approximately 6.2, although the rates were as high as 6.7 in Africa and as low as 5.9 in Asia and Latin America and the Caribbean (Population Reference Bureau Staff 2004). In 2009, the less developed countries had an average TFR of 2.77—over 50 percent lower than their 1950s rate. Even within this reduced rate exists considerable regional discrepancies: South America and Asia report TFRs at about 2.30 and 2.31 respectively, while the countries of Sub-Saharan Africa still see rates in the area of 5.1 (U.S. Census Bureau 2009). Despite the country-to-country differences,

their overall change in fertility has been more drastic and to a greater extent than was expected by demographers (Wattenberg 2002).

It is necessary to address in more detail the concept of “replacement-level fertility.” In recent years, this term has become virtually synonymous with a TFR of 2.1 births per woman. Yet in reality, 2.1 is the number of births necessary to replace the population within a context of very low mortality—typically characteristic of developed nations. As a result, the “true” level of replacement varies globally with the prevailing level of mortality. Espenshade and his colleagues stated in 2003 that the global variation in replacement-level fertility is quite substantial, “ranging from a low of 2.05 for Réunion to a high of 3.43 in Sierra Leone” (Espenshade, Guzman, and Westoff 2003: 575). Years earlier, Coale and Demeny had developed an estimate of the TFR necessary to replace the population at a given life expectancy. For example, at a life expectancy of 25 years, it was estimated that a TFR of 5.21 would replace the population. It was not until life expectancy at birth reached 75 years that the level of replacement approximate the current popular value of 2.1 (Coale and Demeny 1983). In other words, it is critical to keep in mind that there is no “universal constant” for replacement-level fertility, but that the values are “highly country-specific” (Espenshade, Guzman, and Westoff 2003: 575).

This is particularly significant when considering that whereas many of the developing countries have experienced significant fertility decline, the vast majority continue to have fertility rates at least slightly above 2.1. While this would seem to suggest that they are approximately replacing their populations, or even experiencing continued growth, this statement can only be made very generally since in some

instances it may be the case that high rates of mortality necessitate a higher number of births. However, as these countries also typically possess a younger age structure, in many it does appear that their continued growth is secure for some years to come (Population Reference Bureau Staff 2004). Accordingly, the majority of growth experienced in the world today takes place in the poorer, less developed nations:

The less developed countries of Africa, Asia, and Latin America and the Caribbean are projected to increase by just under 50 percent in the 41 years between [2009] and 2050, and the poorest of these are projected to double in population size over that period (Haub and Kent 2009: 3).

When these rates of growth are considered in relation to those experienced by developed nations such as Germany and Italy which are faced with *depopulation*, the magnitude of such a contrast becomes readily apparent. Nonetheless, the Population Reference Bureau emphasizes that if developing nations hold to their current low-fertility path, that the momentum “will eventually subside and population size will stabilize” (Population Reference Bureau Staff 2004: 10).

By 2009, 75 of the world’s countries count themselves among those with below-replacement fertility (Haub and Kent 2009), including some identified by the United Nations as being of lower relative levels of development (e.g. Armenia, the Bahamas, Barbados, Cuba, Macedonia, Mauritius, Moldova, Netherlands Antilles, Palau, Saint Lucia, Singapore, Trinidad and Tobago) (United Nations Statistics Division 2009). Together, below-replacement fertility nations constitute about 36 percent of the countries in the world, or about 50 percent of the global population (Morgan and Taylor 2006). It has been estimated that within the next two decades, nearly all countries will reach low fertility (Morgan 2003). By this point, demographers and population scholars likely

have caught up with this “new demography of depopulation” and will have begun to focus their attentions on the extent of the fertility decline and its repercussions (Wattenberg 2004). Of these, population aging is frequently cited as the most immediate effect of fertility decline. As fewer babies are born and younger cohorts grow smaller, the proportion of younger people in the population shrinks while the proportion of older people grows. For this reason, very low fertility is regularly accompanied by population aging that usually occurs quite rapidly.

Generally speaking, discussions of fertility decline and the resultant population aging tend to concentrate on the economic, political, and environmental consequences. In the next several paragraphs, I will discuss some of these consequences.

Economic. Even in the early years of the twentieth century, scholars like D.V. Glass were hypothesizing the consequences of population decline. In his 1937 *Eugenics Review* article, he presented a practical analysis of several possible outcomes relating to lower rates of fertility. Economic effects were among the foremost discussed. For example, he observed that societies undergoing continual fertility decline may well require such constant economic restructuring that it will become a serious challenge to keep up. He also acknowledged that the flexibility to adapt to new demands and new production—typically met by younger segments of the population—will be impaired by population aging. But in the context of a declining rate of fertility that ultimately stabilizes, he conceded that there is “no reason to fear that the total demand for goods and services will necessarily be reduced with a smaller population, even though the demands for specific products may be smaller” (2005: 564); he added that “it may mean

that fewer toys will be wanted; but on the other hand it may result in a greater demand for armchairs and slippers” (2005: 566). He did allow for the likelihood of layoffs in individual sectors, but maintained that it is not necessarily a prescription for widespread increases in unemployment.

Almost seventy years later, writers like Wattenberg and Longman were making a similar case. Wattenberg argued that the combination of aging and declining populations could cause “economic turmoil of the first magnitude in the developed modern world” (2004: 134). The way in which this would happen would be manifold, but the most direct cause would be through what Longman has termed the “vanishing labor supply” (2004: 15). Lower birthrates mean smaller future cohorts, fewer workers, less producers of goods, and eventually less of the goods and services desired by the population. Furthermore, with less workers paying *into* programs like Social Security and a higher proportion of the population drawing *out of* those same programs, the government will be left with a considerably greater burden in terms of amassing the necessary funding to keep these programs viable (Wattenberg 2004). This issue alludes to the *potential support ratio* (PSR), or the ratio of the size of the population aged 15-64 to the size of the population aged 65 and over (United Nations 2001). As fertility declines and the population ages, the PSR will decrease substantially: there will be fewer workers “supporting” every one individual aged 65 and over.

In a broader sense, less individuals simply means less people generating new ideas, coming up with breaking-edge technologies, and providing a means for the nation to remain competitive in the global marketplace. McDonald emphasizes this point:

In each generation of new technology, conventionally it is young workers who assimilate the technology working in complement with older workers who have capital, wisdom, and ideas for the application of technology. As science advances, the speed of technological change increases. Countries that ignore this reality are placing themselves at risk in a competitive global economic environment... (2006: 486).

The importance of this statement becomes all the more apparent when we consider that a flourishing capitalist economy and population growth go hand in hand. One needs only to look at those parts of the world where population has “become stagnant” (including Japan, much of Europe, and the Great Plains of the United States) to find evidence of capitalism weakening perceptibly (Longman 2004: 4). If this trend holds true within the context of global depopulation, it could necessitate economic restructuring on a massive scale.

Kohler and Ortega emphasize another potential economic outcome based on the smaller cohort sizes that will be making their way up through the educational and economic systems. They point out that these small cohorts may very well encounter “substantially more favorable conditions” in terms of education, employment, and housing markets than their older predecessors in larger cohorts. In turn, experiencing such favorable conditions might lead to “an earlier onset and higher level of fertility” (2003: 409). This is quite reminiscent of Elwood Carlson’s points in *The Lucky Few* (2008), a work which paid special attention to the cohort of individuals born between 1929 and 1945. His central argument is that this group of individuals experienced greater degrees of success and self-fulfillment relating to education, employment, and general economic climate as compared to the prior and successive cohorts due to a unique combination of their small size and historical circumstances. Ultimately, some members of the Lucky Few cohort helped contribute to the Baby Boom—perhaps

evidence that such unique and ideal circumstances can have a direct positive impact on fertility.

An approach like that of Kohler and Ortega calls attention to the possibility of *positive* outcomes from lower fertility and ultimate population decline. Bouvier states that when population levels fall, “in most instances this is a good thing for the society... With fewer people, nations can do so much more for their people—be it improved education, better housing, better roads—the list goes on” (2001: 379-380). This assumes, of course, that most members of a population are more of an economic drain than they are an asset; otherwise, less people would actually mean exponentially less money with which to do the sorts of thing outlined by Bouvier. Theoretically, less people should also mean more job opportunities for the unemployed and underemployed. Grant describes unemployment as Europe’s “greatest economic problem” (2001: 394). This suggests that once the available labor force is exhausted, the anticipated shortage caused by declining fertility may not be quite so severe.

Political. The relationship between population decline and military strength was another of the areas explored by David Glass. Despite concerns that declining fertility would lead to a lowered military position relative to other world powers, he emphasized rationally that most other world powers were experiencing a similar trend in their own populations, and suggested that immigration could be called upon to increase military manpower if necessary (Glass 2005).

Far more recently, this relationship has been analyzed by Wattenberg, though with a much graver prospect. He identifies the primary and secondary geopolitical jobs

of America to be, respectively, defending itself and “vigorously [promoting] social, economic, and individual liberty in America and around the world” (2004: 158). Both of these jobs, he emphasizes, are compromised by the current demographic trends of fertility decline, population aging, and depopulation. The latter issue, as it applies to the virtual entirety of the developed world, is especially serious because it puts both the United States and its allies at a numerical disadvantage. He explains that in the past, numbers were tantamount to “major military advantage,” and he questions what this will mean for the U.S. in the future (2004: 159). However, Morgan insists that “fans of U.S. military might are breathless over its speed and technology, not its size” (Morgan 2003: 600). This implies that, provided U.S. military technology continues to thrive, it could make do without the advantage of size.

Environmental. The environment is another arena that, like employment, would seem to benefit from population decline. Fewer people resulting from below replacement fertility would mean less of a strain on the environment and thus less expenditures in that area. Wattenberg succinctly explains that as the population continues to grow, we will persist in seeing people-based pollution—though less than expected, according to recent fertility rates. After that, as depopulation commences, the amount of pollution will also begin to decrease (Wattenberg 2004). Grant goes into greater detail, noting the kinds of pressures put on the environment by recent world growth, such as critical increases in the amount of natural carbon, nitrogen and phosphate loads in the biosphere; water pollution; atmospheric acidification; climate change; and other fundamental changes to the world ecology. With smaller populations,

nations “could enjoy the benefits of prosperity without the environmental costs that have come to characterize it,” and could better plan for sustainability (2001: 393). The human species would have a smaller relative “footprint” on the environment, and each generation would have the possibility of leaving circumstances better for their own children than those they initially encountered, rather than the other way around.

In light of so many effects, Morgan has astutely observed, “Less polemical low-fertility concerns focus on a shortage of warriors, workers, and consumers... [But] in a global economy, workers and consumers don’t need to be homegrown or national coresidents” (2003: 600). Indeed the concerns surrounding low fertility raise questions regarding the utility of migrants in supplementing the anticipated cut in these “warriors, workers, and consumers.” That is, can bringing in immigrants repair a nation’s age structure, supplement its PSR, and secure its future? Or does resorting to “replacement migration” cause more problems than it solves? The next section of this dissertation explores this possibility and the discussion surrounding it.

Replacement Migration

This matter of replacement migration is currently immersed in great debate. Providing fodder for the two sides was a report released by the United Nations Population Division in March of 2000 entitled *Replacement Migration: Is It a Solution to Declining and Ageing Populations?* This report was meant simply to provide projections to address a number of “what if?” scenarios for eight countries and two regions, and in no way was it meant to recommend the use of “replacement migration”

(a term the UN coined) as a solution to these issues. In this way, policy makers could gauge the severity of the situation for their own nation, and determine how plausible their migration-related options might actually be.

The UN Population Division defines *replacement migration* as “the international migration that would be needed to offset declines in the size of population and declines in population of working age, as well as to offset the overall aging of a population” (United Nations 2000: 7). The “twin problems of population decline and aging” are very important when considering replacement migration, because the number of migrants determined to be “necessary” to reach a certain numeric goal depends on each country’s unique age structure and situation with respect to fertility. In their report, the UN Population Division presented projections in terms of 6 scenarios for the countries of France, Germany, Italy, Japan, the Republic of Korea, the Russian Federation, the United Kingdom of Great Britain and Northern Ireland, and the United States; as well as for the regions of Europe and the European Union. The six scenarios “with regard to the migration streams needed to achieve particular population objectives or outcomes” are as follows:

Scenario 1: the population is projected in the medium variant of *World Population Prospects: 1998 Revision*.

Scenario 2: the medium variant of the *1998 Revision* is used, amended by assuming zero migration after 1995.

Scenario 3: the migration required to maintain the size of the total population at the highest level it would reach in the absence of migration after 1995 is computed.

Scenario 4: the migration necessary to maintain the size of the working-age population (15 to 64 years) at the highest level it would reach in the absence of migration after 1995 is computed.

Scenario 5: the migration required to prevent the ratio of the size of the population aged 15-64 to the size of the population aged 65 or over (the *potential support ratio* described above) from declining below the value of 3.0 is computed.

Scenario 6: the migration required to maintain the PSR at the highest level it would reach in the absence of migration after 1995 is computed (United Nations 2000: 15).

Immigrants, in this study, are assumed to be permanent migrants who ultimately remain in and age with the population of the host country, are subject to the same fertility rates as the national population (Huguet 2003). This is consistent with research that finds immigrant women from countries with high fertility to converge “reasonably quickly” to native-born fertility rates (Kwok 2007).

Based on the unique intersection of characteristics for each country, the UN Population Division made a variety of estimates. For instance, on the one end of the spectrum, France, the United States, the United Kingdom, and the European Union would need smaller or comparable numbers of immigrants to maintain their 1995 population levels (Scenario 3) than they have actually been accepting in recent years. On the other end, countries such as Japan, Korea, and Italy would need to admit levels of immigrants larger than any they have ever seen in order to prevent decline (Bermingham 2001:360). If the goal is to stabilize the working age population (Scenario 4), only the United States would be exempt from the required rapid and extensive rise in

immigration. Even more dramatic would be the numbers of immigrants projected to be necessary to prevent the PSRs from dropping below 3.0 (Scenario 5) or from dipping below their highest post-1995 levels (Scenario 6)—numbers “far too high to be given any serious consideration” (Bermingham 2001: 360).

While recapping the results of the UN report is beyond the scope of this dissertation and has been adequately covered elsewhere (e.g. Hollander 2000; Bermingham 2001; Bouvier 2001; Grant 2001), the passionate debate that ensued after the release of this report is very pertinent in the way that it reflects the severity of the greater social issues of population aging and decline.

Replacement migration as a further problem. That the report put out by the UN inspired great debate among demographers and policy makers alike should come as no surprise. Some found the report to be a blatant promotion of immigration as the solution to population aging and decline. Others described the projections as an endorsement of fears that the PSR would drop to unsupportable levels, and thought they were “evidently meant to suggest their [own] absurdity and thereby make the point that immigration is *not* a solution to what is happening in those countries” (Grant 2001: 392; emphasis mine). In general, two main arguments were developed as evidence against the projections: first, that the levels of immigration required to meet many of the goals outlined in the six scenarios were completely improbable if not impossible; and second, that the social and cultural implications of such immigration, even if it were possible, would be extreme and dire. Grant, for instance, makes the first argument by focusing on Italy’s particular case: to maintain its 1995 PSR, Italy would need to admit about 120

million immigrants between the years of 1995 and 2050, which would leave it with a population in the area of 194 million in 2050. Grant notes that this is “more than three times the size of the 1995 Italian population,” 79 percent of which would be post-1995 immigrants or their descendants. She then asks whether “anybody seriously [thinks] that Italy can grow to be almost as populous as the United States,” and whether it would be “bearable” or “tolerable” on a number of different levels (2001: 395). The most significant of these levels is that of access to resources, such as housing, employment education, health care, and social protection—all of which would need to be virtually revamped to account for so many new residents and their descendants.

Concerns about whether particular levels of immigration are feasible or practical stem from this anticipated impact that those immigrants will have on a given country, whether in terms of the environment, resources, or culture. Consequently, it is the second of the two main arguments that has received the most focus in the literature. As Coleman carefully explains:

The processes described and projected here, resulting from low fertility combined with high immigration, are significant because they are changing the composition of national populations and thereby the culture, physical appearance, social experiences, and self-perceived identity of the inhabitants of...nations (2006: 402).

These potential changes are a particular concern in nations that still emphasize the purity of ethnic heritage. After all, if a country with sub-replacement fertility resorts to replacement immigration to maintain a particular goal with regards to growth, it is mathematically inevitable that the country will come to consist predominantly of a population of immigrant origin (Coleman 2006: 403). Japan is the most obvious

example of a country preoccupied with avoiding such an outcome, especially since it appears to have problems with its current very low levels of immigration. French (2003) describes Japan as “the most tenaciously insular of all the world’s top industrial countries, [where] deeply conservative notions about ethnic purity make it hard for even the experts...to envision large-scale immigration.” Even “good” immigrants—i.e., other Asians who speak perfect Japanese, adopt Japanese names, and live a tidy and quiet existence—face prejudice and discrimination (French 2003). Yet these notions of ethnic and cultural homogeneity are up against not only fears of rapid aging and population decline, but also the demand by some employers for immigrant labor (Coleman 2006: 423). Nonetheless, Tsukuba University population expert Hiroshi Komai does not think even this is enough to push Japanese policy makers to consider incorporating more immigrants. He describes the number of immigrants necessary to prevent population decline as “unimaginable for Japan” in terms of the social limitations of the workplace, culture and educational system. He adds that “societies have always risen and faded, and Japan will likely disappear and something else will take its place, but that’s not such a problem. Greece and Rome disappeared too” (French 2003).

Japan is not unique in its struggle with the prospect of increased non-native populations. Focusing on Europe, Coleman discusses how larger numbers of foreigners mean that immigrants are more often surrounded by others with the same values, language, and ideas about laws, which decreases the likelihood that they will feel obligated to adapt to the host country. Consequently, he feels that:

The social, cultural, and political impact of the projected changes could be substantial, indeed transforming, as urban daily life outside the home is

conducted increasingly in the company of strangers, with an older indigenous population becoming increasingly suburban and rural... The greater cultural, racial, and religious distances between native populations and newer and numerically growing non-Western immigrant populations in Europe may lead to less favorable outcomes for both immigrants and natives..." (2006: 424-425).

That immigrants will be reluctant to assimilate thus seems a central concern throughout many of the countries and regions covered in the UN report. As explained by Masahiro Iba, a Japanese public housing department official, "Integration is easy to call for, but it is very difficult to achieve. You just can't tell people that they must adjust to others" (French 2003). Faced with potential "societal suicide" (Bouvier 2001: 381), it seems there are only three options: to change popular opinion on the subject, to force the issue by telling a nation it must integrate, or to come up with some other plan.

A final interesting consideration relating to using replacement immigration to avoid particular forms of population decline involves the sending countries. As Hollander notes, the UN report is clear that some of their projections seem "out of reach" simply because of the "extraordinarily large number of migrants that would be required" (2000: 148). Thus, it seems quite possible that sending the millions of immigrants necessary to obtain particular population goals in sub-replacement countries would create substantial problems for the countries they are leaving behind, regardless of the outcome for where the migrants end up. If a given host country could make conditions appealing enough to attract the amount of immigration outlined in the UN report, could the sending countries spare that many emigrants? Leon Bouvier presents an excellent idea, suggesting that the UN Population Division prepare a similar report on typical sending countries. Because the majority of these countries are still seeing fairly

rapid growth, such a report could consider the amount of emigration necessary to see an end to population growth (Bouvier 2001: 380). Then, it would be possible to compare the numbers with those projected in the first report to see if there is a match or mismatch between sending countries and their likely destinations, making it apparent whether replacement migration would create problems not only in receiving countries, but in the sending countries as well, or whether certain pairs would see some sort of mutual benefit.

Replacement migration as a solution. The hypothetical outcomes projected in the UN report were not exclusively interpreted through a lens of gloom and doom; many outwardly rejected the notion that this report was mere propaganda for international migration. Instead, it was frequently interpreted in the manner of Bouvier, who summarized it by stating, “To put it in plain language: If a country doesn’t want its population to fall below a certain number, what are its options?” (2001: 379). Indeed, many scholars felt that replacement migration could well hold promise for certain countries. After all, when dealing with a single issue that affects many, there is rarely a blanket solution. Thus, some believe it possible that adjustments to immigration policies might counteract, or at least temporarily abate, the issues of population aging and decline for specific countries.

Whether or not replacement migration can be interpreted as a potential solution for a country depends, obviously, on its current situation and the most appropriate population goal for that situation. Returning to the first main argument against replacement migration as a solution, not *all* the levels of immigration required to

implement any of the six scenarios are completely improbable. As mentioned previously, the numbers of migrants needed to offset population decline in countries like France and the U.S. are less than or fairly close to recent experiences (Bermingham 2001: 360). Likewise, in developing a set of projections very similar to those produced by the UN but for additional Asian countries, Huguet reveals that “the level of net migration required to prevent the working-age population from declining in Singapore, Taiwan and Thailand would be less than current levels of temporary migration” and “should be well within the capacity of policy measures” (2003: 116). Because these countries are already accustomed to the levels of migration outlined by the UN report, the second main argument against replacement migration as a solution—that of the impact of foreign populations—should not be an issue as it is something they must by default already be addressing. Therefore, if maintaining the level of the population was to be a goal in any of these countries, then it could well be possible that replacement migration *could* help the situation. Of course, simply keeping the population at a certain level does not guarantee that there are enough individuals working, or enough workers to generate the necessary financial support for the dependent population. Yet at that point, it is argued that countries can resort to other techniques to increase those rates, such as by getting higher proportions of the current working-age population to actually work. This could be done in any number of ways, such as by encouraging more women to work (often by making child-rearing more compatible with having a career) or by raising the retirement age. Thanks to improvements in health at older ages, the “old demographic convention of a retirement age fixed at 60 or 65” may be perceived as a tad

obsolete (Coleman 1992). Needless to say, such solutions do not take into account the extensive structural inequality in the labor force, and how this inequality would affect policies aimed at increasing labor force participation.

Russia, with its fertility rate well below 2.1, would stand to benefit from replacement migration in a fairly uncommon manner. Factors such as industrialization; war-induced changes in the age structure and family patterns; significantly decreased levels of well-being; and increased exposure to Western attitudes regarding family, reproductive and sex behavior have all led to a precipitous decline in the TFR. However, due to Russia's "systemic, primarily economic crisis," there has also been a considerable growth in the rate of mortality (Rybakovsky 2005: 59). This unique combination of low fertility and high mortality places it under a "double pressure" that is not shared by the Western European nations or by the United States, resulting in "population reproduction mode characterized by European fertility and Afro-Asian mortality" (Rybakovsky 2005: 61). A further complication lies in the fact that this rapid population decline is taking place on an already sparsely-populated expanse of land that is home to one-fifth of the world's total natural resources. Russia is one of the richest countries in the world, with a decreasing ability to defend itself as such—especially when its neighbors, such as China, boast such dense populations. While it seems improbable that China will march in and conquer the eastern sections of Russia, Rybakovsky mentions the concern that those parts of Russia might befall the same fate as "Alaska, Texas, Kosovo and a number of other regions of the world" (2005: 67)—territories, he implies, which ended up transferring hands due to an inability of a given

nation (presumably Russia, Mexico, and Yugoslavia respectively) to defend themselves, maintain their borders, and essentially hold their own. Consequently, replacement migration could well offer many benefits to Russia. It is interesting to note that this nation even has an “ideal” stockpile of migrants, if it can figure out a way to entice them back: the millions of ethnic Russians settled in nearby former Soviet republics.

However, to incorporate these migrants would necessitate tweaking the immigration policy, which is often easier said than done. Nonetheless, Rybakovsky offers this picture of Russia’s future:

More likely than not, an annual migration inflow... is vital for stabilizing Russia’s population numbers and maintaining labor potential at a level sufficient for sustainable economic development. Addressing these two interconnected tasks implies both acceptance of migrants, prospective citizens of Russia, primarily from the former Soviet republics, and invitation, for reasonable periods of time, of labor migrants possessing definite social parameters from countries other than former Soviet republics (2005: 68).

This prospective path for Russia offers a distinct illustration of the multidimensionality of incorporating immigrants as a means to mitigate particular demographic complexities.

Replacement migration and population decline. Together, below-replacement fertility and the ensuing population aging and decline that are already evident in many countries present a “problem” as severe as anything that has never been addressed thoroughly before. This situation that portends doom to some is more likely just a development that will become more and more common as additional countries have to deal with it, and it should be addressed as such. After all, because this development stems from demographic processes, there are only so many options for trying to “engineer demographic change,” an effort Grant points out may indeed prove to be

impossible (2001: 398). If a country elects to adopt replacement migration, then it will need to admit a constant and high level of immigrants, or focus on making the workforce they have more productive. Bermingham offers support for this last possibility by commenting that “perhaps working-age citizens will have to forgo the luxuries of early retirement, short work-weeks, long vacations, non-working spouses, and so forth,” adding that “one way or another, great changes are unavoidable” (2001: 361). The UN report provided countries with a picture of what an *entirely immigration-based* response to population aging and decline would look like. It is up to individual nations to use that knowledge to come up with the best plan for their own situation: perhaps immigration will work to some degree, or perhaps it will be more of a palliative that merely delays problems.

The possibility of replacement migration aside, low fertility should not be viewed as a crisis of epic proportions, or as the path to extinction. As Warren C. Robinson points out, “government programs and private institutions, as well as personal behavior and relationships, will require adjustment, but they will be well within tolerable limits and no more profound or traumatic than other such changes [that]...societies have faced in years past” (2004: 60). In other words, societies will certainly have a challenge on their hands, but history has shown repeatedly the striking capability human beings have to adapt.

Fertility Policies: Potential Coping Mechanisms

Another approach that nations may choose to use to address below-replacement fertility is that of pro-natalist policy. This is not a recent notion: examples of fertility

policies abound throughout history. However, a unique challenge arises in determining the effectiveness of such policies: their effectiveness is based on a comparison with what would have occurred had the policy not been enacted, but it is really impossible to know what would have otherwise taken place (Demeny 2003). Despite this limitation, a close look reveals that pro-natalist and anti-natalist policies alike have been met with varying degrees of perceived success.

Policies of fertility limitation. The most well-known policy of fertility control in history is, arguably, the One Child Policy of the People's Republic of China. Part of the reason is likely due to the extensive coverage of both the policy and its many consequences by critical international scholars and reporters. However, it is less well-known that the policy was conceived by defense scientists based on Marxian philosophy in a determined (and dramatic) effort to thrust China toward modernity. It has been argued, particularly by Susan Greenhalgh, that this manner of scientific policymaking was at such odds with social reality that vast suffering has resulted across the nation (Greenhalgh 2008). This policy was instituted in 1979, and was introduced to the people of China through a comprehensive propaganda campaign complete with a system of sanctions. Initially, these sanctions consisted primarily of incentives for families to limit themselves to one child; the incentives typically consisted of money and preferential treatment in education, health, housing, and employment (Currier 2008). Yet by the mid 1980s, these sanctions also included penalties: "severe fines, ration restrictions, and the denial of registration for higher order births (with implications for health, education, housing) were all used" (Currier 2008: 369).

This policy has had varying degrees of effectiveness. In terms of overall fertility change, the TFR in China dropped from 2.8 in 1979 to 1.8 in 1995 (Currier 2008). Yet similar results have been fleeting in the rural areas, home to the majority of the Chinese population. Over time, the policy has evolved into a de facto two-child policy for many areas and a 1.5 child policy in other areas, stemming from the fact that most families require more than one child—and especially sons—to maintain their agrarian livelihood (see, in this regard, Scharping [2003] for extensive discussions of the very different policies in the various provinces of the country). With the institution of the one child policy, many areas witnessed substantial increases in female infanticide, sex-selective abortion, and the underreporting of births. Consequently, exceptions have been made for rural couples whose first child is either a girl or disabled, or who suffer considerable hardship in their line of work without an additional child, permitting them to have another child (Currier 2008; Scharping 2003).

A specific type of ethical issue is raised by policies of this type that concerns the means employed (manipulation and coercion) to control population growth (Battin 2004). As a response to ethics-based criticism of China's strategy of fertility reduction, many other nations have made a concerted effort to shift their focus to instituting development-based policies, whether in their own countries or in others believed to be in need of assistance. Emphasizing the connection between developed economies and lower fertility, these policies have had the added bonus of appearing to be ethical because development, it was believed, would be accompanied by:

- (1) Improved economic infrastructure;

- (2) More education for girls;
 - (3) Improved economic status for women;
 - (4) Advanced healthcare; and
 - (5) A general disconnect between bearing children and having security in old age
- (Battin 2004).

In other words, “development-based population policies...were aimed not at directly controlling population or restricting individuals’ fertility, but at changing people’s background circumstances for the better” (Battin 2004: 2095). Lower fertility was just a lucky byproduct. Unfortunately, it turned out there were also some less-than-lucky byproducts, ranging from the disruption of existing cultures, to swelling the numbers of the urban poor, to the introduction of “alien cultural and economic values” (Battin 2004: 2096). While these kinds of policies would seem to lead to the hoped-for decrease in levels of fertility, this outcome does not necessarily always leave societies better off.

At last, to address the negative consequences of development-based policies, many countries have exhibited a preference for policies of reproductive health. That is, by providing women with access to a full range of reproductive healthcare ranging from contraception to pre-, peri-, and post-natal care, they place agency in the hands of individuals. The specifics and extents of these programs vary from country to country (Battin 2004), but they have become so common that—as Demeny explains—in the latter part of the 20th century, “population policy in the developing world became essentially synonymous with family planning programs” (2003: 757). An example of a comprehensive approach is that of Bangladesh, where healthcare workers go so far as to

deliver contraceptives to the homes of women who for whatever reason are unable get to public clinics. Unlike the previous types of policies discussed, objections to reproductive-health policies seem to be exclusively moral (e.g. is it moral to prevent the contraception of children which are believed by some to be gifts from God?) and not ethical (Battin 2004).

Pro-natalist policies. Renowned demographer Paul Demeny once drew the following similarity between pro-natalist and fertility reduction policies:

Analytically, the potential population policy issue raised by low fertility is identical to the problem inherent in rapid population growth: it is caused by the disjunction between the sum total of individual reproductive decisions and the collective interest in a long-run demographic equilibrium. But this time individual aspirations generate a deficit rather than an excess in population growth (2003: 759).

Theoretically, it follows that by addressing the disjuncture—influencing individual aspirations in the direction of the collective interest—that the resultant deficit would be ameliorated. This is, not unsurprisingly, more easily said than done, and pro-natalist policies have been met with little and debatable success.

Demeny has identified five conditions under which fertility will decline:

- (1) When parents must take on the bulk of financial responsibility for raising children;
- (2) When women have the opportunity to participate in the labor force, particularly in occupations that are not compatible with bearing and raising children;
- (3) When primary and secondary education are effectively mandated by law;
- (4) When child labor is illegal; and

(5) When children are not the only reliable source of old-age security (2003: 757).

Pro-natalist policies aim to induce individuals to have a greater number of children. To accomplish this goal, it follows that one of the above five methods must be addressed. It goes without saying that the majority of nations would not seek to decrease the quality of life for their citizens; hence, it can be concluded that policies releasing children from the responsibility of primary and secondary education, allowing them to work at young ages, or ensuring them as the only means of old-age security for their parents are extremely unlikely. Instead, policies take one of two forms: direct and indirect.

Direct policies are those attempts to influence fertility that offer incentives to those who have children and/or disincentives to those who do not (Hugo 2000). Commonly, the incentives take the form of monetary value for each child in some form or another: cash payments at the birth of the child or on a monthly basis up to a certain age; income tax breaks for individuals with children; home loans that are written off progressively with the birth of children; paid or unpaid maternity leave; subsidies for childcare or educational-related costs (e.g. school equipment and transportation); reduced rent; among other incentives (Hugo 2000). Disincentives, on the other hand, often take the form of additional taxes for childless individuals. It is important to note that, generally, these types of policies are believed to affect the *timing* of births instead of actually increasing the total number of births per woman. That is, when cash is offered, individuals who were likely to have a birth later anyway will make an effort to have that child sooner so to qualify for the cash incentives, but will not go on to have

more children than they had originally planned. A primary reason for this behavior is that the incentives are oftentimes insignificant when compared to the massive investments that children require—estimated in the U.S. at over one million dollars per child (Bongaarts 2008). Accordingly, programs such as these instituted in the former Czechoslovakia and Australia were met with limited or no increase in total fertility (Hugo 2000).

Direct policies may also be enacted by restricting access to contraception or abortion. In the cases of Romania, Bulgaria, the former Czechoslovakia, and Hungary, this type of restriction did indeed lead to an increase in fertility (Hugo 2000). However, Romania offers an excellent example of how fertility returns to its lower level once the restriction is no longer in place. Even prior to his election as President, Nicolae Ceaușescu communicated his concern that post-World War II Romania was experiencing a dangerous decline in fertility that had begun in the fifties. Under his political influence, and ultimately his presidency, Ceaușescu undertook measures including outlawing induced abortion, encouraging each family to bear three children, closely monitoring pregnancies, discouraging divorce and any use of contraceptives, and taxing individuals over the age of twenty-five who were childless (Keil and Andreescu 1999; Teitelbaum 1972). Some of these mandates, especially the restriction on abortion, resulted in a number of unsafe medical conditions for women. With regards to the total fertility level, however, Ceaușescu did see the rise he hoped for: within a year after the abortion ban was enacted, fertility demonstrated a remarkable increase that persisted above the replacement level for two decades (Bradatan and Firebaugh 2007). However,

what is most interesting about this case is what happened right after the law was abolished: fertility rates fell to below replacement levels. Bradatan and Firebaugh (2007) argue that the strict pro-natalist policies were just a disturbance to the downward trend in fertility, and that Romania ultimately reached the same end of very low fertility, albeit later than it would have without the restrictive policies in place. As a result, any decline in fertility experienced since 1990 (following the fall of Ceaușescu's administration) is simply the continuation of the prior trend, without the artificial inflation in TFR caused by Ceaușescu's policies.

Indirect policies are those aimed at changing the environment in which individuals decide on the number of children they desire (Hugo 2000). Oftentimes, indirect policies come to be synonymous with “family-friendly policies” because they seek to “facilitate the participation of mothers in the paid workforce outside of the home and promote gender equality in the workplace, home and society generally.” Governments will essentially institute policies that attempt to remove the “social barriers” believed to be preventing couples from bearing their desired number of children (Hugo 2000: 190-191). These types of policies are widely advocated. Morgan insists that “...institutional adjustments can make small families feasible in the twenty-first century” (2003: 594). Lutz and his colleagues emphasize that public policy and institutional responses *can* assist women in realizing their intended fertility by addressing the complications surrounding the combination of child rearing with work and/or participation in other activities, which results in making parenthood practical at younger ages (Lutz et al. 2003). McDonald maintains that “institutional settings more

conducive to having children are both desirable and achievable... Benefits accrue both to the individuals concerned and to the society as a whole if fertility ideals can come closer to being fulfilled” (2006: 485). One reason for such support is that these policies are not *explicitly* pro-natalist; that is, they seek to improve gender relations across society, with increased fertility an often-desired byproduct of these improvements. Subsequently, even if they “fail” to increase fertility, they are still likely to have some positive effect on the population. Another reason for the support is demographic research suggesting that tempo effects (i.e. the postponement of childbearing) in addition to an assortment of obstacles—economic, social, and biological—are decreasing levels of fertility by approximately 0.8 to 0.9 births per woman (Bongaarts 2008). If such obstacles or inducements to delay childbearing could be removed, the potential increase to the TFR of 0.8 to 0.9 could easily put a large number of countries back at (or even above) the replacement level. In fact, organizations such as Eurostat have begun to base their projections of future fertility on whether or not such policies have been implemented (Andersson 2008).

Scandinavian countries are often cited as evidence that indirect policies can be relatively effective (Andersson 2008). These are countries believed to have moved the furthest away from traditional Western gender roles, such as that of the male-breadwinner model. Instead, they have a “long tradition of extensive social policies directed at the family” within Nordic welfare states, motivated by “gender equality ideologies and concern for the general well being of children and their families” (Rønsen 2004: 278). Many have policies that include extended maternity and paternity leave,

publicly subsidized childcare, and cash benefits to parents who do not opt to utilize the subsidized childcare. In Sweden, there are even special benefits offered to mothers who choose to closely space their births (Rønsen 2004). While such policies do not always manage to *increase* fertility, it is important to point out that fertility in these countries is *relatively* high (albeit still below 2.1), with slower, less pronounced decline over time (Hugo 2000). As of 2009, Norway reported a total fertility rate of 2.0 births per woman, followed closely behind by both Sweden and Finland at 1.9 (Haub and Kent 2009).

Though (excepting cases like Romania) these policies lack the coercion or manipulation that brought criticism among some of the fertility reduction efforts described above, pro-natalist policies produce their own type of ethical dilemma: what measures should a society take, and for what reasons, in order to increase birthrates (Battin 2004)? For example, can a line be drawn beneath ad campaigns encouraging births to avert population decline and those to produce additional soldiers? Or are there situations in which the interests of society in general be given weight over people's personal choices about reproduction? These are complicated questions with undoubtedly culture-specific answers (if answers do, in fact, exist).

For the most part, many governments in below-replacement fertility countries are not moving to “counteract” their low or declining fertility. This is so for many reasons. First, when low fertility began to occur in several European countries in the 1970s and 1980s, it was typically regarded as a temporary issue stemming from delays in marriage and childbearing. Demographers were confident that the declines would be followed shortly by an upturn in overall levels, and that total fertility would recover and stabilize.

Much of the fertility data of the day suggest that such a recovery has not taken place (McDonald 2006). However, recent evidence has surfaced suggesting that this may still be possible: according to a 2009 study by Myrskylä, Kohler, and Billari, in countries at very advanced levels of the human development index (HDI), additional increases in development could well *reverse* the declining trend in fertility. Essentially, this means that there is a well-established negative relationship between development and fertility—but only up to a point. After that point (which, according to Myrskylä and associates, is within the window of 0.85 to 0.90) fertility and development have a distinct positive relationship.

The study by Myrskylä and colleagues focused on the 24 countries that had attained an HDI level of at least 0.9 by the year 2005 and for which longitudinal data were available for the period from 1975 to 2005. Eighteen of the twenty-four countries, or almost three-quarters of them, exhibited this j-shaped relationship, though it is essential to take note that none of the increases in fertility were substantial enough to return the TFR to the level of replacement. Nevertheless, if this relationship holds true, the implications for the trend of low and very low fertility could be far-reaching. Countries with HDI levels high enough to experience the reversal in their fertility trend are countries with the resources to then address their newly heightened total fertility rates. That is, whereas little might be done to address a TFR of 1.3, Myrskylä, Kohler, and Billari maintain that at 1.89—the average TFR in countries at the highest levels of development—population replacement might be sustained with “relatively modest levels of in-migration” (2009: 741). At low levels of fertility, even small increases may

likewise increase the options that governments have. At this point, it remains to be seen how this finding will be received by the demographic community. One probable outcome from this research is the provision of additional evidence for governments to delay intervention attempts in the hopes that their country, too, may experience a marked reversal in fertility decline. Whether or not this will be the case, none of the countries in the study of Myrskylä, Kohler, and Billari *returned* to the rate of replacement, and this fact must remain under consideration.

A second reason that governments may not be taking measures to address low fertility is based on what is apparently a “conventional wisdom among demographers and economists that pronatalist policies are both expensive and ineffective” (McDonald 487). With the limited means available to engineer positive fertility change, high costs of attempting to do so may well be a deterrent in light of the low likelihood of success. In other words, programs involving incentives such as child care subsidies or loan repayment are likely too expensive for many nations to be worthwhile.

Third, pronatalism can be “politically sensitive” in countries whose past includes fascism and eugenics. Such histories can be shameful and may well persuade governments to adhere strictly to the belief that fertility decisions lie in the realm of private lives, and out of the realm of government influence (McDonald 487).

Finally, in many countries with below replacement fertility, there is still a positive rate of natural increase. In other words, owing to a nation’s current age distribution, the population could still be increasing—this is a phenomenon known in demography as *population momentum*. In such cases, the general public may not be

overly receptive to pro-natalist policies because they are indeed experiencing population growth, even though it is only temporary (Demeny 2003). This is further complicated by the fact that many nations do not necessarily find the promise of a smaller population undesirable, especially in cases where high population densities are an issue.

Additionally, if there is some degree of concern, it may be offset by the belief that increased levels of immigration would be sufficient to counteract or even prevent negative outcomes of depopulation. But as explored above, this is more often than not a mistaken and even unreasonable belief.

The existence of so many obstacles to policy implementation and effectiveness asks the question, why can't policies effectively increase fertility? Why is very low fertility a virtual "trap" (Lutz and Skirbekk 2005) from which countries may struggle futilely but never escape? For answers to these questions, it is prudent to turn to well-established demographic theories in order to assess how they might interpret below-replacement fertility, and whether they offer any possible explanation for reversing the trend.

Fertility Paradigms

Over the decades of the twentieth century, numerous paradigms have been proposed to better understand fertility levels in a population. Within the context of unusual or unexpected change, it is useful to be able to refer to these paradigms in order to investigate how each would explain a given situation. In the paragraphs below, I review six central demographic models—most of which explicitly deal with fertility; I focus on whether they openly account for the below-replacement fertility trend, or how

they might be interpreted to address below-replacement fertility. The last of the models I cover is Bongaarts' proximate determinants model of fertility, which is presented in considerably more depth within its own section because it provides the central theoretical foundation for this dissertation.

Demographic Transition Theory and Intergenerational Wealth Flows Theory.

Demographic Transition Theory (DTT) is credited to Frank Notestein, who relied also on an earlier piece by Warren Thompson (1929). Notestein formally introduced it in his 1945 paper to provide an explanation for the dramatic shift in fertility rates experienced in European and American history (Caldwell 1976). The concept of the *demographic transition* refers, at its most basic conceptualization, to the population shift from high fertility and high mortality to high fertility and low mortality, and ultimately to low mortality and low fertility (Rowland 2003). According to DDT, movement through these three stages is related to the societal transition to urban industrialization or modernization (Caldwell 1976; Rowland 2003).

The initial, pre-industrial stage is generally characterized by societies that are largely agricultural. High fertility rates compensate for the equally high mortality rates resulting from low standards of hygiene and public health tied primarily to a lack of knowledge on the nutrition as well as the causes of and treatments for disease (Guest and Almgren 2001). In this context, it is clear that numerous children will ensure that some survive to adulthood and contribute to the family livelihood. This establishes extended family and kinship groups as the norm, which is in turn reinforced by a host of beliefs and practices. As John C. Caldwell has explained, "agriculture inevitably produced its

own morality” which “placed great emphasis on the centrality of the family” (Caldwell 2004: 298). Similarly, Hirschman has stated that although high fertility was necessary for the survival of the community, “the desire for high levels of childbearing was woven into the cultural fabric and the social institutions of traditional societies,” rather than being a relationship of which most people were consciously aware (2003: 425). At this stage, the population experiences slow, stable growth.

The second stage is characterized by general improvements in standards of living consisting of increases to the food supply and more efficient food distribution, better nutrition, improved sanitation and personal hygiene, and gains in medical knowledge leading to greater control over infectious and environmental diseases. In turn, this results in a sharp decrease in mortality, especially with regard to infant and maternal mortality (Guest and Almgren 2001). During this initial period of decreased mortality, traditional notions of the family tend to persist and fertility rates remain high. As fertility rates greatly exceed mortality rates, societies experience a *population explosion*. In his original argument, Notestein observed that mortality is more likely than fertility to respond quickly to these changes, and therefore in this transitional period, birth rates substantially exceed death rates (Casterline 2003).

Finally, the third stage typically occurs in more mature industrial societies. In many cases, this means that the traditional focus on agriculture gives way to a greater emphasis on jobs in manufacturing and the urban service industry. Ultimately, fertility experiences a rapid decline to rates often as low as the mortality rates, and population growth becomes stable and essentially negligible (Guest and Almgren 2001). In some

cases, fertility rates may become so low that some societies will begin to witness depopulation. As Hirschman explains, “the transition from high to low fertility was not only an unprecedented demographic revolution but also a cultural revolution with profound implications for the definition of the family and the adult roles of women and men” 2003: 426). As such, women’s roles are likely to undergo considerable change as they increasingly become participants in the labor force. Simultaneously, traditional notions of the family begin to erode, and smaller families become the norm. This is aided by the fact that the likelihood of children surviving beyond age 5 or 10 has increased, along with their demand for consumption (e.g. education and other resources) which gives them few economic benefits (Guest and Almgren 2001). Additionally, there may be greater stress on individualism and the achievement of personal aspirations, or a desire on the part of the younger generations to improve upon the living standards of their parents (Cleland 2003).

While the theory recognizes the eventual stabilization of fertility and mortality rates, it does not explicitly address below-replacement fertility. However, the balance of these last factors—higher levels of education and labor force participation among women, the economic costs of children, and culture of individualism—*could* reasonably be tied to below-replacement fertility. The extent to which each exists in conjunction with the others could well contribute to rates of fertility so low that populations would cease to replace themselves in the absence of migration. In fact, some modern interpretations of DTT specify the transition as having four stages, where the period of “incipient decline” and very low fertility and mortality constitute the fourth stage

(Poston and Bouvier 2010). At this point, according to Poston and Bouvier, “populations only grow when there are fluctuations in fertility, such as in the baby boom in the U.S. after World War II.” They go on to explain that their use of the term *incipient* signifies that “it is not really possible to determine how low fertility will go” (2010: 79). They interpret this to suggest that a fifth stage of DTT—the stage of population decline—may soon be in order.

Other demographers also recognize the significance of population decline. They do so by distinguishing it as its own transition altogether, dubbing it the “second demographic transition” (Van De Kaa 2003). Dirk J. Van De Kaa explains this as follows:

...if fertility had indeed declined to replacement level, there would then have been little interest in post-transitional fertility trends... But things did not turn out that way. Advanced industrial societies face a new imbalance between the components of natural population growth. Fertility has declined well below replacement level. Life expectancies at advanced ages have risen substantially. The combination of the two leads to a rapidly ageing population. Negative rates of natural population growth are already observed in numerous countries. National projections show that this phenomenon will spread. There are no indications this state of affairs is temporary: hence the conclusion that a second demographic transition is in progress (2003: 872).

Making this distinction addresses the limitation of the original demographic transition theory’s ability to account for below-replacement fertility in any depth. Yet the identification of this trend as a separate transition does not provide any theoretical explanation for its occurrence, or expectation for its future trajectory. If a Second Demographic Transition Theory is in the works, it is still to come.

Other issues with DTT should also be addressed. For instance, the theory has been largely criticized for its emphasis on modernization as the driving force behind the

transition because of its ethnocentric implications. While DTT is based on the Western experience, fertility transition is a universal phenomenon—that is, every country in the world may be assigned a place on the demographic transition continuum. However, because the stages are based on Western history, the tendency has been to associate the first stages with irrationality, which subsequently portrays pre-transitional societies as ignorant or even brutish (Caldwell 1976). Thus, when currently developing nations are “placed” into those stages on the continuum, these characteristics are often—even unintentionally—applied to them. In response, the emphasis of DTT has shifted over time from a focus on urbanization and industrialization as the causes behind transitions to the rational motivations of individuals. In his call for a reinstatement of DTT, Caldwell concludes that:

In general, in societies of every type and stage of development, fertility behavior is rational, and fertility is high or low as a result of economic benefits to individuals, couples, or families in its being so. Whether high or low fertility is economically rational is determined by social conditions: primarily by the direction of the intergenerational wealth flow (1976: 355).

Caldwell’s above reference to the direction of the intergenerational wealth flow alludes to his own theory by the same name, which centers on fertility as a rational choice. When wealth flows from child to parent, the desire would be typically to have unlimited numbers of children because children are net assets. When wealth flows from parent to child, the tendency is toward childlessness. The transition from the state of “unlimited” children to the tendency toward childless hinges upon the emotional and economic “nucleation” of the family (Caldwell 1976: 355). This occurs when parents shift their focus from their ancestors and extended families to their children, and even

their children's children (Caldwell 1976: 322). As Robinson succinctly states, “the very low fertility currently prevalent arises out of a *deliberate choice by couples within the context* of the modern urban-industrial society, but it is strongly affected by prevailing social and cultural views that high fertility threatens the future of the globe” (2004: 61; emphasis mine). Ultimately, the emphasis is on rationality for all fertility-based decisions, irrespective of a society's level of development. Thus, to say that parents in less developed countries are “irrational” because they continue to have large families is to misunderstand these societies. They are making the most rational decision within their particular context.

Epidemiological Transition Theory. Along with Demographic Transition Theory, Epidemiological Transition Theory is arguably one of the most commonly-known theories among demographers. This is due to the fact that the transitions for which both of these theories are named may be viewed as two of the most important broad developments in world population history. As with DTT, Epidemiological Transition Theory can grant insight into changes in fertility over a wide spectrum of cultures and societies.

Epidemiological Transition Theory (ETT) was introduced in the 1970s by Abdel R. Omran to provide an explanation for shifts in mortality and morbidity. *Epidemiology* refers to “the study of the distribution and determinants of mortality (death) and morbidity (illness) in human populations” (LaVeist 2005: 54). Thus, the theory describes the shift in the distribution and determinants from deaths caused by infectious

and parasitic diseases to deaths caused by degenerative diseases such as heart disease and cancer. This occurs over the following three stages:

- (1) *The Age of Pestilence and Famine*: the primary causes of mortality are influenza, pneumonia, smallpox, tuberculosis, and other related diseases. Mortality rates are high—especially among infants and children—and life expectancy at birth is low, often just 20 to 40 years (Ailshire 2009).
- (2) *The Age of Receding Pandemics*: mortality declines rapidly due to improved sanitation as well as increases in standards of living and public health. Mortality is still high—people are dying from other causes—but life expectancy increases from the previous ages to between 30 and 50 years (Poston and Bouvier 2010).
- (3) *The Age of Degenerative and Manmade Diseases*: mortality declines take place due to medical advances in the prevention and treatment of infectious diseases, so that diseases such as heart disease, cancer and stroke are now most prevalent. A rapid rise in life expectancy along with low mortality rates establish, for the first time, fertility as the primary factor in population growth (Poston and Bouvier 2010).

First and foremost a theory focusing on mortality trends, ETT does not ostensibly address changes in fertility, let alone specifically below-replacement fertility. However, fertility levels may be considered as almost a residual effect of changes in mortality. That is, during the Age of Pestilence and Famine, high fertility rates were needed to counteract the high mortality of infants and children; otherwise, societies would have died out at this point. Similarly, high fertility rates would need to be maintained during

the Age of Receding Pandemics because the mortality rates remained high, though not quite as high as during the first stage. In this manner, it seems likely that fertility would drop to very low levels in the Age of Degenerative and Manmade Diseases, when infant mortality is significantly lower and the majority of children are well-assured to survive into adulthood. Increased life expectancy allows for a rational evaluation of family roles and desires regarding childbearing with the knowledge that both children and adults will live to very old ages. In other words, because everyone is living longer, there is not the same pressing need for high fertility. Additionally, with all those extra years to live, there is more time for working toward the accomplishment of personal achievements and dreams. This may result in a greater emphasis on individualism. As a child consumes more than he/she can contribute for many years, people may choose to have fewer (or no) children so that they will have more resources per each member of the family.

The Economic Model of Fertility. Richard Easterlin's Economic Model of Fertility takes a closer look at this notion of childbearing as an economic consideration. Formally introduced in 1975, it relates fertility levels to the supply and demand of children in a society. That is, "children are viewed as a special kind of good, and fertility is the response to the consumer's demand for children relative to other goods" (Easterlin 1975: 54). Specifically, Easterlin identifies the following three determinants of fertility:

- (1) *The demand for children* is represented as the number of surviving children parents would desire if fertility regulation were costless. This demand may be determined by factors such as income, the price of children relative to other

goods, and the subjective preference an individual or couple has for children compared to other goods.

(2) *The potential output of children* is equated to the number of surviving children parents would have if they did not deliberately limit fertility. Such a number is related to (and varies with) factors such as the frequency of intercourse, sexual desire, involuntary abstinence (e.g. based on impotence), involuntary fecundity or infecundity, involuntary fetal mortality, the level of natural fertility, and the survival prospects of a baby to adulthood.

(3) *The costs of fertility regulation* include both *attitude* (the subjective or psychic costs) and *access* (the objective costs—the time and money required to learn about and use specific techniques) (Easterlin 1975).

Under the above conditions, this model holds that the fertility level fluctuates because both supply and demand are affected by societal changes. Applied to the trend of below-replacement fertility, it could suggest a number of things. For example, the demand for children may decrease substantially because the cost of raising a child is so high, especially relative to income. Children require a longer and larger investment to house, clothe, feed, and educate them into adulthood. On the other hand, fertility may decrease because of less sexual activity among couples: couples who might otherwise have children may be more focused on their educations or careers. Subsequently, the potential output of children may be very low, resulting in fewer births. Whichever explanation may be most likely in a given context, Easterlin's framework provides a unique perspective on below-replacement fertility by focusing on today's commodity-

oriented individualistic mindset. In either hypothetical scenario, fertility would be likely to continue to drop to very low levels, and to stay quite low, until the complications affecting the demand for and potential output of children were ameliorated. Depending on the specifics, this could involve family-friendly programs designed to make having a child more compatible with having a career. Essentially, what such a program would do would be to lower the relative cost of having children.

The Human Ecological Theory of Fertility . The Human Ecological Theory of Fertility offers a macro-level explanation of fertility by focusing on the level of sustenance organization in a society. It argues that the complexity of a society's sustenance organization is negatively related with fertility: that is, the more complex a society becomes with respect to its sustenance organization, the lower its fertility. According to Poston and Frisbie, this occurs based on the fact that when sustenance organizations become complex but fertility remains high, a large proportion of the sustenance produced is thus consumed directly by the population, which limits "the population's flexibility for adapting to environmental, technological, and other kinds of changes and fluctuations" (2005: 606). They go on to explain that, as a result, low fertility is more appropriate for the needs and requirements of such a sustenance organization since it leaves a higher proportion of the resources uncommitted. In other words, with fewer children, there is more sustenance available for investment back into the system, becoming available as mobile or fluid resources. This results in making investment resources "available for increasing complexity, given requisite changes in the environment and technology" (Poston and Frisbie 2005: 607).

This theory supplies, perhaps, the most direct application to below-replacement fertility. The majority of below-replacement nations are considered “developed” (72 percent of the 76 countries reporting below-replacement rates in 2009 [United Nations Statistics Division 2009]). It is thus possible to say that many of these nations have complex sustenance organizations, as is typically the case in societies with very specialized market-based economies. High fertility rates are undesirable or impractical among such nations because better-paying jobs require a greater investment of resources in the form of education or experience. Children would absorb the hours that could otherwise go into these pursuits, and so fertility drops as individuals invest their resources in themselves, and concurrently into the sustenance organization. This is necessary if a given nation intends to be competitive in the global marketplace among the other developed nations. When fertility rates remain high, then a given economy has nowhere to go; it does not have the resources to grow or improve. Subsequently, a focus on global competitiveness might have the force to drive rates lower and lower to levels such as those present today.

Bongaarts’ Proximate Determinants Model of Fertility

The Bongaarts’ proximate determinants model of fertility is the focus of a vast number of demographic studies. This famous technique for analyzing fertility trends essentially revolutionized the way demographers look at a population’s total fertility rate, influencing both data collection and analysis in the field of fertility studies.

Consequently, any serious application of the model necessitates a thorough understanding of both its structure and interpretation.

The proximate determinants model was first introduced in 1956 in a different form by Kingsley Davis and Judith Blake, who developed 11 “intermediate fertility variables.” These were the 11 factors they had singled out “through which and only through which social, economic, and cultural conditions can affect fertility” (1956: 179). There were many significant features of this framework, the greatest of which was most likely the way in which it emphasized the direct effect of these fertility variables. Another important feature was the way the framework emphasized the presence of all 11 variables in *every* society, even when a particular variable perhaps seemed to have no effect. In such a case, as in a society where none of the women were using birth control, it was the *absence* of the practice of birth control that was considered to be a form of influence. Each of the 11 variables was thus working in either positive or negative ways in every population, the aggregated result of which was the population’s fertility level.

While well-received and even regarded as pioneering, the framework proposed by Davis and Blake was difficult to quantify. Accordingly, Bongaarts revised the model in 1978 to produce 8 proximate determinants grouped into three broad categories as follows (Bongaarts 1978: 106):

- (1) Exposure factors
 - a. Proportion married
- (2) Deliberate marital fertility control factors
 - a. Contraception

- b. Induced abortion

(3) Natural marital fertility factors

- a. Lactational infecundability
- b. Frequency of intercourse
- c. Sterility
- d. Spontaneous intrauterine mortality
- e. Duration of the fertile period

Much like the Davis and Blake framework, these proximate determinants of fertility are behavioral and biological variables that directly influence fertility, and are distinct from other types of variables because all others—such as family planning, socioeconomic, and attitudinal variables—must operate *through* the proximate determinants to influence fertility. Furthermore, as was the case with the intermediate variables of Davis and Blake, each of the proximate determinants can operate to increase or decrease fertility, and do not need to operate in the same direction. Where they are significantly different from their predecessors is in their ability to be easily quantified and clearly interpreted. These quantitative interpretations apply only to the first four of the proximate determinants, because though Bongaarts initially identified eight, he acknowledged that the first four actually account for the majority of the variation in a population's total fertility rate. In his famous 1982 study using data from 41 developed, developing, and historical populations, these four proximate determinants were shown to account for 96 percent of the variance in the TFR. Consequently, Bongaarts determined that “the remaining intermediate variables—natural fecundability (or frequency of intercourse),

spontaneous intrauterine mortality, and permanent sterility—are generally much less important although they may substantially affect fertility in some populations” (1982: 186).

The quantitative indices developed for the first four proximate determinants each range from 0 to 1, where 0 represents complete fertility inhibition and 1 represents no fertility-inhibiting effect of a given intermediate variable. In other words, the higher the value for a particular proximate determinant, the higher the corresponding fertility.

Consequently, the four indices may be represented as follows:

C_m : The marriage pattern index has a value of 1 when all women of reproductive ages are in a marital or consensual union and 0 when none of them are in such unions.

C_c : The index of contraception equals 1 if no contraception is used in the population and equals 0 if all fecund women are using completely effective modern methods of contraception.

C_i : The postpartum infecundability index equals 1 when no women are experiencing postpartum infecundability (absence of lactation) and 0 when all women are (the duration of infecundability is infinite).

C_a : The index of abortion equals 1 when there is no induced abortion practiced in the population and 0 if every pregnancy that occurs is aborted.

Bongaarts also identified four different types of fertility levels from which the impact of these four intermediate variables can be derived. That is, by isolating certain combinations of proximate determinants, the four following fertility levels result:

- (1) The *Total Fertility Rate* (TFR) refers to the rate at of legitimate births that result when the inhibiting effects of all intermediate variables are present.
- (2) The *Total Marital Fertility Rate* (TM) results when the fertility-inhibiting effect of celibacy is removed.
- (3) The *Total Natural Marital Fertility Rate* (TN) results when all practice of contraception and induced abortion is eliminated in addition to the effect of celibacy.
- (4) The *Total Fecundity Rate* (TF) is the fertility level that occurs when the combined effect of the remaining intermediate variables is removed, namely fecundability, spontaneous intrauterine mortality, and permanent sterility.

Bongaarts estimated this value to be about 15.3 for all women.

These fertility levels are related to the indices in the following ways:

$$C_m = \text{TFR}/\text{TM}$$

$$C_c \times C_a = \text{TM}/\text{TN}$$

$$C_i = \text{TN}/\text{TF}$$

$$\text{TFR} = C_m \times C_c \times C_a \times C_i \times \text{TF} \quad (1)$$

The latter relationship, Equation 1, is the most noteworthy because it summarizes the relationship between the TFR and the four principle proximate determinants.

Importantly, Bongaarts notes that Equation 1 is not to be used as a new way to estimate the TFR, but to give “an approximate breakdown of the contributions made by different intermediate variables to levels and trends in fertility” (1982: 184). Equation 1 serves as a focal point for this dissertation.

Since its inception, the proximate determinant framework has been adapted for a wide variety of purposes. Stover articulately identifies the five most common:

- (1) Decomposing the contribution of each of the proximate determinants to the realization of the current level of the total fertility rate
- (2) Analyzing the contribution of changes in the proximate determinants to changes in the total fertility rate over time
- (3) Comparing the differences in fertility between two or more countries or regions on the basis of differences in the proximate determinants
- (4) Estimating total abortion rates as a residual after the effects of all other proximate determinants have been removed
- (5) Projecting future levels of contraceptive use that would be required to achieve fertility goals given expected changes in the other proximate determinants or future levels of fertility given expected or desired changes in contraceptive use (1998: 255).

Quite often, the model is used to investigate unusual fertility-related circumstances. For instance, Bongaarts, Frank, and Lesthaeghe (1984) tested the framework in the early eighties in Sub-Saharan Africa. In light of a puzzling lack of contraception or induced abortion, they were interested in determining why there was considerable variation in national, subnational, and individual level fertility in this area. They discovered that lactational amenorrhea resulting from breastfeeding; postpartum sexual abstinence; and pathological, involuntary infertility—a proximate determinant introduced in their study for the first time—were the principal proximate determinants in

Sub-Saharan Africa. Furthermore, they reflected on the behaviors that impact these determinants, and how they may or may not be influenced. In this situation, an understanding of the true underlying causes of fertility variation produced valuable knowledge for governments concerned with rapid population growth and poor economic conditions.

Bongaarts undertook a similar investigation in 1987 when, in examining the relationship between contraceptive use and fertility in a number of developing countries, he found four countries—Yemen, Kenya, Syria, and Jordan—to have fertility rates far in excess of what one would expect. These results were extremely interesting in light of the fact that contraceptive prevalence usually predicts fertility better than any other indicator of reproductive behavior. Subsequently, Bongaarts applied the proximate determinants model to identify an explanation for the high fertility. In doing so, he discovered that in each of these four countries, both breastfeeding and the marriage pattern exerted *smaller* fertility-inhibiting effects than in other societies with the same level of contraceptive prevalence, and that these differences accounted for a large part of the excess fertility (Bongaarts 1987). As a result, he concluded that in some situations, “it is quite possible for fertility to remain constant or even rise temporarily as contraceptive use increases, because other proximate determinants can exert offsetting upward pressure on fertility... If contraceptive prevalence continues to rise, however, fertility inevitably declines” (1987: 138). This investigation shed new light on the relationship between contraceptive prevalence and fertility.

The proximate determinants model has also been commonly applied to examine

change in one society or population over time. This was the case in Onuoha's study of the relative contributions of the proximate determinants to fertility change in Senegal. Senegal was one of the few Western African countries to launch a formal population policy in the mid-1970s to reduce its level of fertility. The policy was unsuccessful, however, and the fertility level of the country remained very high (Onuoha 1992). Onuoha suspected a misunderstanding of the principal variables actually determining fertility in Senegal might be partially to blame, and sought to identify the relative contributions of the major proximate determinants of fertility in an effort to remedy the situation. His application of the model revealed that post-partum infecundability accounted for the largest proportion of births averted at both the earlier and latter survey dates—a finding consistent with a number of other studies in the sub-Saharan African region. Yet he determined this practice had little potential for additional influence on fertility in the future, since its impact was already high. Instead, he pointed to the index of contraception which had exerted only a minor influence on fertility change, and thus possessed considerable potential for incorporation into fertility reduction policies in the future (Onuoha 1992).

Islam, Islam, and Chakroborty (2003) also employed the proximate determinants model to explain change in a country over time. Their focus was on Bangladesh, which was notable for undergoing a substantial decline in fertility: the TFR dropped from a high of 6.3 in 1975 to 3.4 during the early 1990s, despite any concurrent increases in socioeconomic or health status in the population. With such an unusual disassociation from the more common indicators of fertility decline, Islam and colleagues set out to

determine the causes of the change in and ultimate stabilization of Bangladeshi fertility. They examined data from the Bangladesh Demographic and Health Surveys using a proximate determinants framework and identified a number of important relationships. First, while postpartum fecundability had long been the “most important and strongest fertility reducing factor” for the country, this had changed in recent years for two reasons: (1) an increasing usage and fertility-inhibiting of contraception, and (2) a declining trend in the lactational amenorrheic period leading to a decrease in its fertility reducing effect (2003: 368). Second, while the fertility reducing effect of contraceptives was most pronounced for the middle and older age groups, the effect of marriage continued to be strongest for the 15-19 and 20-24 age groups. Islam and colleagues interpreted this to mean that the fertility-promoting effect of early marriage was also weakening. Interestingly, the combination of a weaker postpartum infecundability and stronger marriage fertility inhibiting effect resulted in little change in the combined effect of the two determinants over the period of analysis; that is, the rise in births attributed to the former was effectively cancelled out by the decrease due to the latter. Finally, the stabilization or “plateauing” of fertility that occurred in the late 1990s was attributable to a tempo effect, and was actually just a “short-term fluctuation” within a greater trend of fertility decline (2003: 368). The knowledge generated by this research had significant implications for Bangladeshi public policy, since continued efforts to decrease fertility could be clearly aimed at continuing the spread of effective contraceptive use.

Knodel, Chamratrithirong, and Debavalya (1987) presented another notable example of applying the proximate determinants to examine change in a population over

time. They investigated the unusually rapid and pervasive decline in fertility that took place over several decades in Thailand, despite its predominantly rural and agrarian status. The entirety of their analysis is guided by what they referred to as the “now-familiar distinction between proximate and other fertility determinants” (1987: 9). Essentially, they start with the proximate determinants, and as they progress through their analysis they begin to incorporate other fertility influences as they work *through* the proximate determinants. This is meant to address the situation that “since many of the proximate determinants are influenced by volitional actions and choice, attitudes directly concerning fertility as well as attitudes about the proximate determinants themselves are an important feature of any explanation of reproductive change” (1987: 9). However, what is particularly remarkable about their study is its comprehensive examination of how knowledge of the fertility transition is enhanced and strengthened by integrating both quantitative and qualitative methods. While specifics about the statistical transition from many births to only two or three is easily measured with quantitative data and methods, less easy to identify statistically is *why* such a transition took place in a country that is less developed. That is, qualitative data and methods allowed for a deeper examination of the reasons the reduction took place and made it possible to derive a more complete picture of the issue than either analysis could provide separately—even within the proximate determinants framework, which is usually applied in a primarily quantitative way. The qualitative aspect of their study consisted of in-depth focus groups with Thai men and women of all ages. The questions covered all aspects of their fertility behavior, leading Knodel and his colleagues to make interesting

and innovative discoveries about the various mechanisms behind the transition: a series of interrelated and fundamental changes in socioeconomic conditions, a favorable cultural setting for reproductive change, substantial latent demand for fertility control prior to the actual decline, and a national family planning program that increased awareness and accessibility to acceptable and effective means of contraception. In other words, whereas the quantitative analysis revealed that contraceptive use was the main proximate determinant accounting for Thailand's fertility decline, the qualitative analysis added extensive depth and insight to this conclusion by suggesting some of the interrelated elements working behind the scenes.

Another study utilized the change-over-time application of the proximate determinants model within a specifically below-replacement context. Sibanda, Woubalem, Hogan, and Lindstrom (2003) examined how the proximate determinants could account for a very unique situation in Addis Ababa, the capital of Ethiopia. Whereas over the years 1990 to 2000, the TFR in the rest of the country was declining slightly from 6.4 to 5.9, the capital experienced a remarkable decline from 3.1 to 1.9 without the presence of any strong or effective national family planning program. Using Bongaarts' model, the researchers determined that it was actually a decrease in the age-specific proportions of women married that were responsible for the change, as well as an increase in contraceptive use. The social implications of these results were then considered and evaluated.

In addition to standard applications of the Bongaarts model, several scholars have considered or attempted modifications to the proximate determinants framework

(Hobcraft and Little 1984; Moreno 1991; Reinis 1992). Stover's (1998) research is a particularly good example; he considers various ways in which, twenty years after its inception, the proximate determinants model might be modernized. He considers each element of Equation (1) in turn (see above), offering possible improvements. Some of his most noteworthy comments include identifying, as I did previously, the discrepancy between the index of marriage and the behavior it is actually meant to represent in modern times, namely, sexual activity. His recommendation is to use a more direct measure of the proportion of women who are sexually active and representing it in its own index, C_x . With regards to the index of postpartum infecundability he expanded it to combine the effects of postpartum abstinence and lactational amenorrhea. He refers to this effect as *postpartum insusceptibility* and describes it as a "more complete measure of the fertility-inhibiting effects of the postpartum period" (Stover 1998: 257). Instead of the standard measure of 15.3 for total fecundity (TF) in Equation (1), Stover defines the reproductive period as extended from 15 to 49—excluding infecundity, which he now incorporates into its own index. The result is a value of 21 for what he calls "potential fertility," or "the total fertility rate for a population of women who are sexually active and fecund for the entire period from age 15 to 49 and who do not practice breastfeeding, experience post-partum abstinence, nor practice contraception" (Stover 1998: 262). In the end, he provides both a new model as well as the circumstances best suited for its use. In this dissertation, I will consider some of Stover's recommendations within the context of below-replacement fertility countries in my attempt to determine whether his modifications improve the capability of accounting

for variation in the total fertility rate.

The proximate determinants of below replacement fertility. Bongaarts himself has identified a number of determinants of low fertility by focusing on the relationship between fertility preferences and behavior. He has argued that while desired family size certainly declines during the fertility transition, actual levels of fertility often fail to meet these desires (Bongaarts 2001). He explains *why* individuals do not realize these aspirations by examining the manner in which the following behaviors alter fertility levels relative to intended family size (IFS):

- (1) *Unwanted fertility* emphasizes that deviations from intended family size can include not only falling short of the number of children one desires, but exceeding that number. Bongaarts explains that the prevalence of unwanted childbearing rises substantially with the onset of the fertility transition because the decline in desired family size “leads to an increase in the proportion of women who are at risk of having more births than they wish” (2001: 266).
- (2) A *replacement effect* accounts for parents who have additional children after the death of a child for the purpose of reaching a desired number of surviving children. When this occurs, the number of births a couple has is increased, though the desired family size remains unchanged. Because of the relative rarity of this occurrence, replacement of this type has only a slight impact on fertility levels in what Bongaarts terms “late-transitional societies” (2001: 269). Quantified, if every woman replaced a dead infant (it has been estimated that only half actually do), fertility would only increase by about

0.02 births per woman (Bongaarts 2001).

- (3) *Sex preferences* can cause individuals to have additional children after reaching their desired family size in order to obtain a similarly desired gender ratio. For example, if a couple hopes to have just two children, a boy and a girl, but go on to have two sons, they may have an additional child in an attempt to produce a daughter. It can be difficult to determine the effect of gender preference on fertility levels because it necessitates a wealth of information, including the structure preferences for gender and family size and the manner whereby parents address a conflict between sex composition and size (Bongaarts 2001).
- (4) The *tempo effect* represents the effect of postponing births on period measures of fertility. Essentially, the act of delaying births depresses measures like the TFR. That is, as the mean age at childbearing increases, the TFR may appear to decrease significantly though completed fertility is not affected. Other measures, such as the tempo-adjusted total fertility rate (ATFR) represent synthetic period fertility without the distortion caused by changes in the timing of childbearing. The difference between the ATFR and TFR corresponds to the distortion, or “tempo effect” (Bongaarts 2008: 41).
- (5) *Involuntary infertility* can consist of an inability to find a suitable partner, the disruption of a union prior to the conception of children (due to death or divorce), and physiological or disease-induced sterility. Bongaarts states that the prevalence of involuntary fertility tends to be higher “in populations with

late ages at first union, high proportions never entering unions, high rates of divorce or widowhood, large desired family sizes, and high levels of prevalence of sexually transmitted diseases” (2001: 275). However, it can be difficult to measure to the extent that it cannot always be separated from the limitation of childbearing that is voluntary.

- (6) *Competition* acknowledges that other preferences—such as those relating to money, career, and “freedom from childcare responsibilities”—may result in some women achieving lower fertility than they had anticipated.

These factors are particularly significant in the way that they provide both a framework for interpreting variations in fertility levels across social and cultural contexts and a means for comparisons between groups (Morgan and Taylor 2006). Specifically, within the below-replacement context, they may well provide a starting point for respecifying some of the traditional proximate determinants of fertility.

I have been unable to find anywhere in the literature a recent analysis of the proximate determinants model in either South Korea or the United States, and no analysis designed with the intent of testing and modifying the model for below-replacement fertility application. As such, this dissertation endeavors to address this gap in the literature by applying Bongaarts’ original proximate determinants to two low fertility nations in order to assess the individual strength of each determinant within this context.

In the next chapter of this dissertation, a number of hypotheses are formulated. Additionally, the data are discussed in some detail, as well as the methods that will be employed in the two central analyses to test the hypotheses.

CHAPTER III

HYPOTHESES, DATA, AND METHODS

In this chapter, I synthesize the basic findings and information presented in the literature review in the previous chapter. This information is then incorporated into a number of hypotheses. I also address some of the more technical aspects of the dissertation, both describing in detail the data that will be used and discussing the methods that are utilized in the two main analyses to test the hypotheses.

Hypotheses

Based on the review of the literature, it is apparent that the proximate determinants model of fertility is an effective means for decomposing the total fertility rate. It is also apparent that the below-replacement fertility phenomenon currently taking place lacks a solid theoretical foundation by which to explain and understand it. Consequently, I hypothesize that the proximate determinants model of fertility will not explain over 90 percent of the variation in the total fertility rates of two below-replacement nations, as it did when applied to a combination of primarily developing nations and historical populations in Bongaarts' original study.

In my dissertation, I will be undertaking two main analyses. Whereas the case studies constituting the first entail many quantitative considerations, it is the second analysis in which I will use the proximate determinants to examine the fertility behavior of women in South Korea and the United States in the 1970s and 2000s. Each

determinant will be considered individually with respect to how it has changed over time; then, I will employ the four quantitative indices of the proximate determinants as independent variables in an analysis of the fertility behavior at both points in time.

For the above analyses, I present the following specific hypotheses:

1. The effect of the marriage determinant among Korea women and U.S. women will be weaker in the 2000s than it was in the 1970s.
2. The effect of the contraception determinant among Korea women and U.S. women will be weaker in the 2000s than it was in the 1970s.
3. The effect of the postpartum infecundability determinant among Korea women and U.S. women will not be significantly different in the 2000s than it was in the 1970s.
4. The effect of the induced abortion determinant among Korea women and U.S. women will not be significantly different in the 2000s than it was in the 1970s.
5. Change in the index of marriage will contribute significantly to change in the fertility rate of South Korean women between the 1970s and the 2000s.
6. Change in the index of contraception will contribute significantly to change in the fertility rate of South Korea women between the 1970s and the 2000s.
7. Change in the index of abortion will not contribute significantly to change in the fertility rate of South Korea women between the 1970s and the 2000s.

8. Change in the index of postpartum infecundability will not contribute significantly to change in the fertility rate of South Korea women between the 1970s and the 2000s.
9. Change in the index of marriage will contribute significantly to change in the fertility rate of women in the United States between the 1970s and the 2000s.
10. Change in the index of contraception will contribute significantly to change in the fertility rate of U. S. women between the 1970s and the 2000s.
11. Change in the index of abortion will contribute significantly to change in the fertility rate of women in the United States between the 1970s and the 2000s.
12. Change in the index of postpartum infecundability will not contribute significantly to change in the fertility rate of women in the United States between the 1970s and the 2000s.

Description of the Data

The broader focus of this dissertation is on all countries whose fertility falls below the rate of replacement, or a total fertility rate of 2.1 births per woman. The Population Reference Bureau's *World Population Data Sheets* identified 74 such countries who, for 2006, 2007 and 2008, have an average total fertility rates over those three years below 2.1. By averaging the TFRs over a three-year period, it is far less likely that any of the countries identified are actually outliers—included simply because they experienced a temporary drop in fertility during any one of the three years. Each of these countries is identified alphabetically in Table 1 along with its average three-year

TFR and fertility classification according to the distinctions assigned by Francesco C. Billari (2004). Billari's categorizations are generally well-accepted in the low-fertility literature and are as follows: "low" fertility countries are those with TFRs below the replacement level of 2.1 but greater than 1.49; "very low" fertility countries are those with TFRs below 1.5 but greater than 1.29; and "lowest low" fertility countries are those with TFRs below 1.3 (Billari 2004). Among the 74 countries in Table 1, the mean TFR is 1.567—"low" fertility, but not quite "very low." Regarding the Billari classifications, 37 countries are considered to have low fertility, 27 have very low fertility, and just 10 fall into the "lowest low" category. This breakdown is illustrated in Figure 1 below.

Another interesting distinction among the below-replacement fertility nations is their unofficial United Nations development designation. According to the United Nations Statistics Division:

There is no established convention for the designation of "developed" and "developing" countries or areas in the United Nations system. In common practice, Japan in Asia, Canada and the United States in northern America, Australia and New Zealand in Oceania, and Europe are considered "developed" regions or areas. In international trade statistics, the Southern African Customs Union is also treated as a developed region and Israel as a developed country; countries emerging from the former Yugoslavia are treated as developing countries; and countries of eastern Europe and of the Commonwealth of Independent States (code 172) in Europe are not included under either developed or developing regions (2008).

However, the UN has consistently identified "least developed countries" or LDCs, land-locked developing countries or LLDCs, and small island developing states or SIDS. LDCs are classified based on the highest level of disadvantage in their process of development, resulting in greater challenges and a more significant struggle to emerge from poverty. These nations are characterized by their low income, weak human assets,

Table 1. Below Replacement Fertility Nations by Average Total Fertility Rate and Billari Classification: 2006 to 2008

Country	2006-2008	
	Average TFR	Billari Classification
Albania	1.77	Low
Andorra	1.27	lowest low
Armenia	1.70	Low
Australia	1.83	Low
Austria	1.40	very low
Bahamas	2.03	Low
Barbados	1.80	Low
Belarus	1.27	lowest low
Belgium	1.67	Low
Bosnia-Herzegovina	1.20	lowest low
Bulgaria	1.37	very low
Canada	1.53	Low
Channel Islands	1.40	very low
Chile	2.00	Low
China	1.60	Low
Costa Rica	1.90	Low
Croatia	1.40	very low
Cuba	1.47	very low
Cyprus	1.50	Low
Czech Republic	1.33	very low
Denmark	1.83	Low
Estonia	1.60	Low
Finland	1.80	Low
France	1.97	Low
Georgia	1.43	very low
Germany	1.30	very low
Greece	1.33	very low
Hong Kong (China SAR)	1.00	lowest low
Hungary	1.30	very low
Iran	2.03	Low
Ireland	1.97	Low
Italy	1.33	very low
Japan	1.30	very low
Latvia	1.40	very low

Table 1 cont.

Country	2006-2008	
	Average TFR	Billari Classification
Liechtenstein	1.40	very low
Lithuania	1.33	very low
Luxembourg	1.67	Low
Macao (China SAR)	0.93	lowest low
Macedonia	1.43	very low
Malta	1.40	very low
Martinique	1.97	Low
Mauritius	1.73	Low
Moldova	1.30	very low
Mongolia	2.07	Low
Montenegro	1.63	Low
Netherlands	1.70	Low
Netherlands Antilles	1.93	Low
New Zealand	2.07	Low
North Korea	2.00	Low
Norway	1.87	Low
Palau	2.03	Low
Poland	1.30	very low
Portugal	1.37	very low
Puerto Rico	1.73	Low
Romania	1.30	very low
Russia	1.33	very low
Saint Lucia	1.30	very low
Saint Vincent & the Grenadines	2.07	Low
San Marino	1.20	lowest low
Serbia	1.67	Low
Singapore	1.30	very low
Slovakia	1.27	lowest low
Slovenia	1.30	very low
South Korea	1.17	lowest low
Spain	1.37	very low
Sweden	1.87	Low
Switzerland	1.43	very low
Taiwan	1.10	lowest low

Table 1 cont.

Country	2006-2008	
	Average TFR	Billari Classification
Thailand	1.67	Low
Trinidad and Tobago	1.60	Low
Tunisia	2.00	Low
Ukraine	1.27	lowest low
United Kingdom	1.83	Low
United States	2.07	Low

Sources: Billari 2004; Haub 2006; Haub 2007; Haub and Kent 2008

and economic vulnerability (United Nations Conference on Trade and Development 2002a). LLDCs are characterized by poor physical infrastructures, weak institutional and productive capacities, small domestic market that are remote from world markets, and high vulnerability to external shocks. Accordingly, they are considered among the most disadvantaged and severely challenged countries (United Nations Conference on Trade and Development 2002b). Finally, SIDS are distinguished based on their small size, remoteness from large markets, and high economic vulnerability to economic and natural shocks considered beyond domestic control, all of which results in a greater risk of marginalization from the global economy. However, it must be noted that whereas criteria exist by which to classify LDCs and LLDCs, the designation of SIDS is entirely unofficial based on a lack of such established criteria by which to identify these nations (United Nations Conference on Trade and Development 2002c). The list made available on the United Nations Conference on Trade and Development website is provided solely for analytical purposes.

Essentially, countries that fall into these categories are not those typically

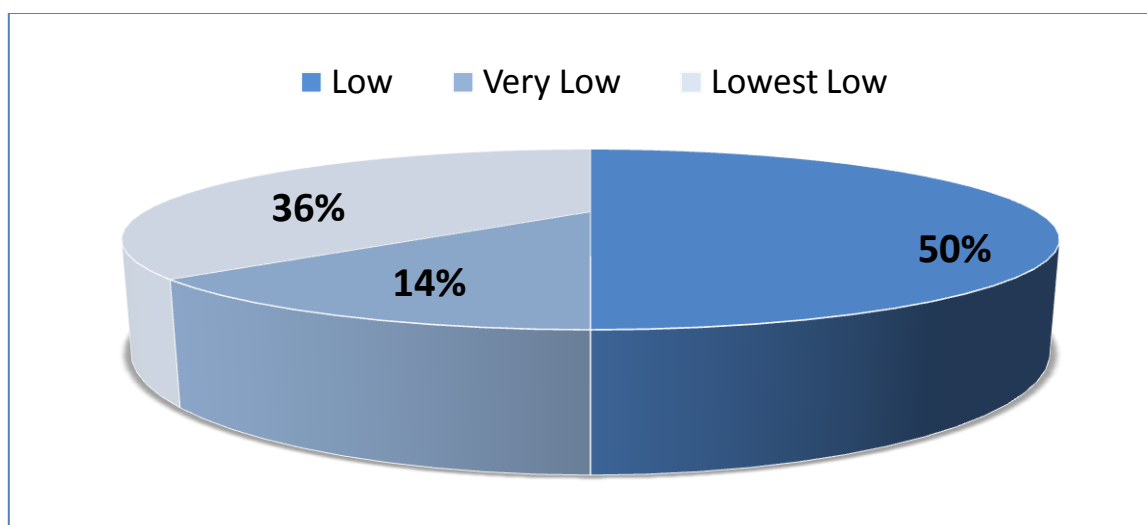


Figure 1. Below-Replacement Fertility Nations According to Billari Classification of Fertility

thought of to also possess levels of fertility below replacement, which are commonly developed nations that have completed their demographic transition. Nations that have yet to transition into a state with a developed market economy oftentimes have not experienced the sharp drop in fertility following improvements in life expectancy that frequently results in below-replacement fertility rates. Yet among the 74 countries with average TFRs below 2.1, ten are classified as either an LLDC or SIDS (see Table 2). These ten countries consist of four landlocked developing countries and six small island developing states. Their average 2006 to 2008 total fertility rates range from 1.30 in Moldova and Saint Lucia to 2.07 in Mongolia and Saint Vincent and the Grenadines. Because of their unique status as developing, below-replacement fertility nations, each would undoubtedly provide an interesting case study into their specific causes of fertility decline.

Though as previously stated, the broader focus of this dissertation is on these 74

Table 2. Below Replacement Fertility Nations with Unofficial United Nations**Designations**

Country	2006-2008 Average TFR	Unofficial UN Designation
Armenia	1.70	Landlocked Developing Country
Bahamas	2.03	Small Island Developing State
Barbados	1.80	Small Island Developing State
Macedonia	1.43	Landlocked Developing Country
Moldova	1.30	Landlocked Developing Country
Mongolia	2.07	Landlocked Developing Country
Palau	2.03	Small Island Developing State
Saint Lucia	1.30	Small Island Developing State
Saint Vincent & the Grenadines	2.07	Small Island Developing State
Trinidad and Tobago	1.60	Small Island Developing State

Sources: Haub 2006; Haub 2007; Haub and Kent 2008; United Nations Conference on Trade and Development 2002d; United Nations Conference on Trade and Development 2006

countries, only two are selected for closer examination. This occurs in two separate analyses. In the first, case studies are conducted for two of the countries included by John Bongaarts in his 1982 investigation on the proximate determinants of fertility: South Korea and the United States. These two cases were selected from all of the countries included in Bongaarts' original study primarily owing to the completeness and availability of the necessary comparative data. Additionally, I sought to select two relatively different countries; that is, I aimed to avoid selecting countries with relatively similar experiences in their fertility transition so that the case studies might ultimately produce a more diverse array of fertility-related information. Accordingly, South Korea witnessed a decline from nearly 6 births in 1960 and 4 births per woman in 1970 to an average TFR for the period of 2006 to 2008 of just 1.17, while the U.S. underwent a much slighter decline from 2.34 in 1967 to an average of 2.07 for 2006 through 2008

(Bongaarts and Potter 1983; Haub 2006; Haub 2007; Haub and Kent 2008). While both are unmistakably low fertility nations, they fall at virtually opposite ends of the below-fertility spectrum.

My two main analyses mimic the style of Knodel, Chamrathirong, and Debavalya's 1987 study of fertility decline Thailand. Whereas their study was remarkable for its incorporation of both quantitative and qualitative analyses, I draw solely on their quantitative investigation. To do so necessitated comprehensive fertility data for each country at two separate points in time. These data were drawn from numerous sources, including the Population Reference Bureau (PRB) *World Population Data Sheets* for 2006, 2007, and 2008; the PRB *2008 Family Planning Worldwide Data Sheet*; the United Nations Population Division *World Marriage Data 2006*; the United Nations *2007 Demographic Yearbook*; and the United Nations *World Contraceptive Use 2007*.

The PRB *World Population Data Sheets* are "used around the world and [are] widely considered to be the most accurate source of information on population" (Haub and Kent 2008: 16). The broad goal of the PRB is to inform people of the world about issues relating to population, health, and the environment, as well as to empower people to use that knowledge "to advance the well-being of current and future generations" (Haub and Kent 2008: 16). The PRB data sheets consist of numerous statistics including the mid-year population, net migration rate, maternal mortality rate, percent of population ages 15-49 with HIV/AIDS, and the percent of population with access to improved water sources, to give a selection. For the purposes of this dissertation, I draw

from the PRB data sheets only the total fertility rate data. Information for the *World Population Data Sheets* are collected from a variety of sources ranging from official country statistical yearbooks, bulletins, and websites; the *United Nations Demographic Yearbook, 2005* of the UN Statistics Division; *World Population Prospects: The 2006 Revision* of the UN Population Division; *Recent Demographic Developments in Europe, 2005* of the Council of Europe and the International Data Base and library resources of the International Programs Center at the U.S. Census Bureau (Haub and Kent 2008: 15).

The PRB *2008 Family Planning Worldwide Data Sheet* operates under the same broad goals as the population data sheets, namely, to “inform, empower, and advance,” but focuses on providing fertility- and contraceptive-related data. These measures include the percent of women giving birth by age 18, the percent of women using modern vs. traditional methods of birth control, the source of supply of modern methods of birth control, as well as the percentage of women using contraception according to their wealth quintile. For the purposes of this dissertation, I made use of the percent of married women using various types of birth control methods. Information for this data sheet is gathered from similarly varied sources, including the Demographic and Health Surveys, the U.S. Centers for Disease Control and Prevention Reproductive Health Surveys, the UNICEF Multiple Indicator Cluster Surveys, the Pan-Arab Project for Family Health, the Family Health Surveys, the Gulf Fertility Surveys, the Fertility and Family Surveys, various national surveys, and other sources as well. As with the *World Population Data Sheets*, the *2008 Family Planning Worldwide Data Sheet* is highly regarded.

Additional contraception data were obtained from the *World Contraceptive Use 2007* datasheet produced by the United Nations. It is purported to provide “the latest data available on key dimensions of reproductive health, including two of the indicators for the Millennium Development Goals, namely, contraceptive prevalence relative to the use of any method (indicator 5.3) and unmet need for family planning (indicator 5.6) (United Nations Population Division 2008). The data for this publication were gathered from a variety of country-level surveys and nationally representative samples of women in the reproductive ages. In total, these data account for 99.7 percent of women of reproductive age in a marriage or consensual union worldwide. Whereas data on contraceptive prevalence referring to 1985 or later are available for 170 of the over 190 countries in the world, only 109 countries have data as recent as the year 2000, representing 85.8 percent of women of reproductive age in a marriage or consensual union (United Nations Population Division 2008); of these, only 41 are below-replacement fertility nations with contraceptive prevalence data for the majority of contraception types.

The *World Marriage Data 2006* datasheet is produced by the United Nations Population Division. It consists of numerous indicators that were “selected in such a way as to present a concise picture of marital behavior from both period and cohort perspectives” (United Nations Population Division 2007a). The data are compiled from a wide variety of sources that include civil registrations, population censuses and nationally representative sample surveys. The UN Population Division emphasizes that in the process of collecting these data, “the basic criterion for inclusion of data [was] its

reliability,” with no attempts made to estimate missing data (2007a).

The *Demographic Yearbook 2007* is another product of the United Nations. This publication is produced annually and is based on a set of questionnaires dispatched by the UN Statistics Division to national statistical offices across the world. It is a very well-known source for what are considered to be “official statistics on a wide range of topics” including population size and composition, births, deaths, marriages, divorces, economic activity, educational attainment, household characteristics, housing, ethnicity and language, and more (United Nations Population Division 2009).

Descriptions of country-specific datasets utilized are as follows:

United States

For the United States case study, this dissertation relies primarily on data from the National Survey of Family Growth (NSFG) Cycles 1, 2 and 6. Conducted by the National Center for Health Statistics, the NSFG is “an ongoing series of sample surveys designed to provide current information about childbearing, contraception, and related aspects of maternal and child health for the United States” (Lepkowski, Mosher, and Davis 2006: 4). At its core, the NSFG employs a multistage probability sample to select respondents for face-to-face personal interview. Cycle 1 was undertaken in 1973 with a sample consisting of 9,797 women aged 15-44 living in the coterminous U.S. who were currently married, previously married, or never married but with offspring living in households during that year. The response rate for this round of data collection was approximately 80 percent (ICPSR 2008). The NSFG Cycle 1 data provided extensive information on pregnancies, including “family planning practices and consultations,

prenatal and postnatal care, medical conditions, number of pregnancies and live births, problems experienced in conceiving, complicated pregnancies, sterilization, and medical checkup history” as well as desired number of children, birth expectations, and family size preferences among considerable demographic information. Cycle 2 collected largely the same types of information from 8,611 women in 1976 (Mosher 1980). Cycle 6 was conducted in 2002 and early 2003, and is the latest and largest version of the survey available to date. The data were collected from interviews administered to a nationally representative sample of 12,571 women and men ages 15-44, and was the first to include men in the interview process. As such, it is an effective tool for estimating the number of individuals with particular characteristics in the U.S. household population. On this note, it is important to emphasize that the survey sample for the NSFG is not a “scale model” of the population; instead, particular groups were selected at different rates in order to overrepresent some of the smaller groups in the sample. Consequently, to be able to make accurate inferences from the data, “sampling weights” must be utilized. “‘Sampling weights’ adjust for these different sample rates, response rates, and coverage rates so that unbiased national estimates can be made from the sample” (Lepkowski, Mosher, and Davis 2006: 2). Put differently, the sampling weight for a given respondent indicates the number of persons in the population represented by that individual. In order to account for the sampling weights, Stata’s *svy* (survey) suite of commands is employed as necessary so that all estimates presented in this dissertation are based on the weighted data.

Additional data for the United States was drawn from the National Vital

Statistics System (NVSS), which includes information for births, deaths, marriages, and divorces collected by the National Center for Health Statistics. In particular, this dissertation relies on data concerning marriages and births drawn from the natality file, which provides information on a wide variety of maternal and infant demographic and health characteristics for babies born in the United States (Ventura 2009).

South Korea

The case study analysis of South Korea uses a more eclectic collection of data sources. For the 1970s, the primary source is the Korean National Fertility Survey conducted in 1974 and part of the World Fertility Survey (WFS) initiative. This was a survey from a national sample of 5,430 ever-married women under the age of 50 and is considered “one of the few in the WFS developing country program to have collected a reasonably complete history of contraceptive use” (Office of Population Research n.d.). Furthermore, the data provide comprehensive information on topics such as co-residence and contact with husband's and respondent's parents; mother's family size; number of sons born to mother-in-law and whether husband is the eldest son; expectations about sons' and daughters' education and perceived financial burden; expectations about various types of support from children; hours worked by respondent in last/current job; respondent's attitude to employment; husband's fertility preferences; respondent's fertility preferences at time of first marriage and desired timing of first birth; household ownership of consumer durables; size of dwelling; area of paddy/dry land owned/rented, and more (Office of Population Research n.d.).

While there is no current version of the Korean Fertility Survey, there are many

other data sources that may serve as its equivalent and which I use here in my dissertation. The principal sources of data are the 2003 National Fertility and Family Health Survey and the 2005 National Survey on Marriage and Fertility Trends, both conducted by the Korea Institute for Health and Social Affairs (KIHASA); and an array of data collection efforts on the part of the Korean National Statistical Office (KNSO), such as population and household censuses, vital statistics, and more.

The 2003 National Fertility and Family Health Survey is the 19th round of a series of fertility surveys conducted periodically since 1964. It took place between May 12th and August 31st in 2003, and consisted of individual interviews of 8,890 women aged 15 to 49. The purpose of the research included identifying changes in fertility and child-rearing behaviors over time, as well as analyzing ways by which to improve the quality of life for families (Korea Institute for Health and Social Affairs 2006). The personal interviews covered topics such as marriage, pregnancy and birth histories, contraception, maternal and child health, family values and relationships, the quality of family life, and numerous demographic characteristics (Korea Institute for Health and Social Affairs 2006; Chung, Kim, and Nam 2007).

The 2005 National Survey on Marriage and Fertility Trends covered much of the same topics as the 2003 survey. It was based on interviews with 8,890 women chosen in a national sample of households. However, it was instituted as a reaction to the low-fertility phenomenon taking place across the world. KIHASA aimed to gather information on the trends in order to identify their social and economic impact, and to draw conclusions about the future. These included endeavoring to discover the cause of South Korea's low fertility

so that an effective policy might be put into place to restore higher rates of birth. Specific topics covered in the interviews included values, assessments of self-fulfillment, educational attainment, employment, income and job security, child care, housing, the compatibility of family and career, and declining fertility rates.

The Korean National Statistical Office also covers very broad fertility-based topics in its survey research, but only as one part of more extensive undertakings. According to the KNSO website, the purpose of the organization is the overall planning and coordination of national statistics, the establishment of statistical standards, the production and distribution of various economic and social statistics, the processing and management of statistical information, and the provision of various statistical data (Korean National Statistical Office 2009). Data for the South Korean case study are drawn from many KNSO products, including the annual *Census Report on Population and Housing*, *Women's Statistics Yearbook*, *Changes in Key Characteristics of Marriages and Divorces Since 1970*, *Social Statistics Survey*, *Annual Report on the Vital Statistics* and others.

Because the primary data and the majority of KIHASA and NSO reports are only available in Korean, my research utilizes a collection of analyses and articles based on the results of the above-mentioned surveys to compile the necessary data for the comparative portion of the case study.

Methods

The purpose of my dissertation is to examine the effectiveness of the proximate

determinants model in analyses of two below-replacement fertility countries. As discussed above, this is done in two separate analyses. The first analysis consists of the two case studies in the style of the quantitative portion of Knodel, Chamrathirong, and Debavalya's 1987 analysis of fertility decline in Thailand. Within the United States and South Korea, I take an in-depth look at Bongaarts' four primary proximate determinants, one by one, at the national level. Instead of simply calculating the quantitative index for each determinant, I consider the determinant contextually. For example, I explore:

- ♦ How have marriage trends changed over time in both of these countries?
- ♦ Does most exposure to sexual intercourse occur within marriage?
- ♦ How has the extent of nonmarital sexual relations and its implications for fertility changed over time?
- ♦ What is the proportion of couples unable to bear children due to primary sterility?
- ♦ Are there any reliable statistics on coital frequency?
- ♦ What kinds of lactation data are available in these countries?
- ♦ Has there been a noticeable/significant change in the mean duration of breastfeeding?
- ♦ What is the level of contraceptive awareness in these countries?
- ♦ How reliable are the data on induced abortion?
- ♦ If it is believed that current data underestimate induced abortions, by how much?
- ♦ Are people more or less willing to have had an abortion due to prevailing

religious beliefs in these countries?

These questions are among the many delved into in an effort to better grasp the manifestation of each determinant in two very different nations over thirty years.

After each determinant has been thusly explored, the second analysis assesses the fertility-inhibiting effect of the four determinants by calculating the respective quantitative index representing the determinant for both the 1970s and the 2000s, and comparing the two measurements. For both years, I consider the fertility level that would prevail in the determinant's presence as well as the level that would exist in its absence as was done in the study by Knodel, Chamrathirong, and Debavalya. Finally, I use each of the indices to calculate the TFR and assess how the strength of the model varies over time in both countries. That is, given the values of the four indices and the value of the TFR in both the 1970s and the 2000s, is the model consistent in its predictive ability? Does its predictive ability vary in an expected way? In other words, does the new model explain less variance in a country's fertility when it is higher, and more when it is below replacement, or vice versa?

In this second analysis, my "independent variables" per se consist of the four indices calculated according to the equations provided by Bongaarts and Potter in their 1983 model, as follows:

Index of Marriage

$$C_m = \Sigma m(a) g(a) / \Sigma g(a) \quad (2)$$

where

$m(a)$ = age-specific proportions currently married (or in consensual union)

among females; and

$g(a)$ = age-specific marital fertility rates.

Index of Contraception

$$C_c = 1 - 1.08 * u * e \quad (3)$$

where

u = proportion currently using contraception among married women of reproductive age (male methods, abstinence other than postpartum, and sterilizing operations are included); and

e = average use-effectiveness of contraception, the weighted average of the method specific use-effectiveness levels $e(m)$ with the weights equal to the proportion of women using a given method, $u(m)$: $e = \sum e(m) u(m)/u$.

Index of Induced Abortion

$$C_a = \frac{\text{TFR}}{\text{TFR} + b * \text{TA}} = \frac{\text{TFR}}{\text{TFR} + .4 * (1 + u) * \text{TA}} \quad (4)$$

where

TA = total abortion rate, the number of induced abortions per woman at the end of the reproductive period if induced abortion rates remain at prevailing levels throughout the reproductive period (excluding induced abortions to women who are not married);

b = the average number of births averted per induced abortion, approximated by the equation $b = 0.4 (1 + u)$; and

u = proportion currently using contraception among married women of reproductive age (male methods, abstinence other than postpartum, and

sterilizing operations are included).

Index of Postpartum Infecundability

$$C_i = \frac{20}{18.5 + i} \quad (5)$$

where

i = average duration of postpartum infecundability caused by breastfeeding or postpartum abstinence.

After these two analyses, I begin the process of developing a theoretical model of the proximate determinants in below-replacement fertility countries.

This chapter has introduced the data and methods that I will use to test the proximate determinants model within a below-replacement fertility context. The next two chapter of this dissertation analyzes changes in each determinant over time in two countries: South Korea and the United States, respectively. They supply a contextual foundation for the quantitative analysis to be undertaken in Chapter VI.

CHAPTER IV

THE PROXIMATE DETERMINANTS OF FERTILITY IN SOUTH KOREA

In this chapter, I discuss the manner in which the proximate determinants of fertility have affected the course of fertility in South Korea over time from the 1970s to the 2000s. I have adopted the style of Knodel, Chamrathirong, and Debavalya's 1987 study of fertility decline in Thailand and their identification of the role the proximate determinants played in affecting the course of fertility in South Korea over time. (For a more comprehensive description of the work by Knodel and his colleagues, please refer to Chapter II.) In the case study in this chapter, I undertake an in-depth look at the four primary proximate determinants, one by one, at the sub-national level in South Korea.

The benefits of conducting case studies are manifold. Undoubtedly, macro-level analyses of an extensive selection of countries can be ideal for identifying global and regional trends. However, the discovery of trends does not necessarily entail the identification of *explanations* for the trends. By selecting a small number of countries for more thorough investigation, it is likely that their individual experiences may elucidate possible explanatory factors of the larger-scale trends. Furthermore, it is also possible that a close examination of a small number of cases may well reveal outlying influences on the greater trends. In both kinds of outcomes, the information gained is very valuable in its complementary nature for the macro-level analysis, and in its ability to provide a foundation for the development of theory.

As previously explained, the selection of South Korea and the United States as

the subjects for my case studies in this and in the next chapter was based on three criteria:

- (1) *Inclusion in Bongaarts' original research*: Both South Korea and the United States were among the 41 developed, developing, and historical populations that were included in Bongaarts' famous 1982 study. It was in this study that Bongaarts was able to show how the four proximate determinants accounted for 96 percent of the variance in the TFR. Even more significant is the connection to his 1978 article, "A Framework for Analyzing the Proximate Determinants of Fertility," in which he first introduced his modified version of the Davis and Blake intermediate fertility variables framework. In this article, he actually selected South Korea and the United States as the two "numerical illustrations" of his new model. In these illustrations, he examined changes in each determinants' quantitative index over time, namely from 1960 to 1970 for South Korea, and 1965 to 1973 for the United States. In this way, my dissertation may be viewed as an up-to-date extension of Bongaarts' 1978 investigation.
- (2) *Fertility experiences*: Among the 41 populations included in Bongaarts' 1982 research, I narrowed the selection to those with fertility above replacement in the 1960s to 70s and with below replacement fertility in the 2006 to 2008 period. Because Bongaarts' study consisted of quite a few developing nations whose fertility is still today above the rate of replacement, this effectively eliminated the majority of cases.

(3) *Data availability*: Among those nations who were left (South Korea, the United States, France, and Costa Rica) I further narrowed the selection based on the availability of data. When he utilized South Korea as a numerical illustration, Bongaarts commented that the country “is one of the few developing countries where measurements of reproductive variables are sufficiently detailed to allow the calculation of the indexes of the intermediate fertility variables at different points in time” (1978: 123). Years later, South Korea remains among the minority of all nations with this kind of comprehensive fertility data. The United States may also be counted in this group, with large-scale fertility surveys like the National Survey of Family Growth conducted every few years. Conversely, Costa Rica presented significant challenges in terms of obtaining current data on the proximate determinants, eliminating it from the selection. France presented difficulties in obtaining the necessary historical data. Furthermore, I considered France to be “too similar” to the United States; if I used two Western nations with fairly comparable levels of fertility both in the 1970s and 2000s, the information gained would not be as interesting as that gathered from nations with more varied experiences.

As Suzuki (2008) states, “there is a cultural divide between moderately low fertility and lowest-low fertility” (36). The United States and South Korea represent the two sides of this divide. Thus, with their abundant data and very unique fertility experiences, the United States and South Korea presented themselves as the ideal choices.

The Proximate Determinants: A Review

As discussed in Chapter II, when Bongaarts revised the Davis and Blake intermediate fertility variables framework into his proximate determinants model, he grouped the determinants into three broad categories:

- (1) Exposure factors
 - a. Proportion married
- (2) Deliberate marital fertility control factors
 - a. Contraception
 - b. Induced abortion
- (3) Natural marital fertility factors
 - a. Lactational infecundability
 - b. Frequency of intercourse
 - c. Sterility
 - d. Spontaneous intrauterine mortality
 - e. Duration of the fertile period (Bongaarts 1978: 106).

For both of my two case studies, I will discuss the role of each of these individual determinants as Knodel, Chamrathirong, and Debavalya did in their 1987 study of Thailand.

The Republic of Korea (hitherto and henceforth referred to simply as “South Korea”) has a vast and interesting history of fertility change over the past thirty to forty years. As Suzuki explains, “in the 1960s and 1970s, Korea suffered from a Malthusian nightmare of over-population under rapid population growth and high population

density” (2008: 36). The legacy of this “nightmare” would affect both government-level fertility decisions and individuals’ experiences with fertility over the coming decades. The most notable outcome was the successful implementation of a population control policy, beginning in 1962, which occurred simultaneously with rapid socioeconomic development (Cho 2002). Its effectiveness is evident in the reduction of the total fertility rate from 6.0 in 1960 to 1.4 in 1999. However, this blanket trend masks differences in the contributions of the factors pertaining to marriage and marital disruption, the natural marital fertility factors (including postpartum infecundability), and the deliberate marital fertility control factors of contraception and induced abortion.

Marriage and Marital Disruption

In the 1970s, it could be said that “for women in most societies, exposure to childbearing commences at the time of entry into a more or less stable sexual union” (Korea Institute for Family Planning [KIFP] 1974: 65). In South Korea, this was certainly the case with the vast majority of childbirth taking place within formal marriages, and this remains the case today. As Lee explains, “ceremonial marriage is established as a strong social norm, and extramarital childbearing is not socially accepted,” often being met with “cold treatment and criticism” (2009: 61-62). Consequently, strong social sanctions exist to discourage illegitimate births (KIFP 1974). Even though there are no reliable statistics on the issue, it is believed that extramarital births in South Korea are still fairly rare as a result (Suzuki 2005).

Because of this relationship between marriage and childbearing, the timing of

Table 3. Percentage Single by Age and Sex (in percentages): South Korea, 1970 and 2000

Sex	Year	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Females	1970	97.1	57.2	9.7	1.4	0.4	0.2	0.1
	2000	99.3	89.1	40.1	10.7	4.3	2.6	1.7
Males	1970	99.7	92.6	43.4	6.4	1.2	0.4	0.2
	2000	99.7	97.5	71.0	28.1	10.6	4.9	2.4

Source: Eun 2003

first marriage and percentage single by age (see Table 3) become very telling proxies of the duration of exposure to sexual relations. The mean age at first marriage for females has witnessed substantial growth, from 20.0 in 1974 (KIFP 1974) to 28.3 in 2008 (Statistics Korea 2009a), representing an increase of 41.5 percent. By the time a woman was between the ages of 30 and 34 back in 1970, she was extremely like to be married, with only 1.4 percent of women in that age group identifying themselves as single (Jones 2005). As the mean age at first marriage increased over the decades, so did the proportion of single females, with 10.7 percent of women aged 30-34 identifying themselves as such by the year 2000 (Jones 2005). The most extensive increase in terms of percentage points was witnessed by women ages 25 to 29, who increased 30.4 points from 9.7 percent single in 1970 to 40.1 percent in 2000. However, the largest percent gain may be found among the 45 to 49-year-olds, whose climb from 0.1 percent single in 1970 to 1.7 percent in 2000 represented an increase of 1,600 percent. Thus, whereas thirty years ago it could be said that virtually all women in South Korea would marry at some point in their lives, this is no longer the case.

Males have also experienced these trends. Their rise in mean age at first marriage from an estimated 27.2 in 1974 to 31.4 in 2008 is slightly less than that undergone by females, but it nonetheless reveals that males consistently marry at a later average age than females. Also, as with the females, this trend is accompanied by a notable increase in the proportion single. Traditionally, there has been a higher proportion of single males than females at all ages, though this trend is far more pronounced at the younger ages. For example, in 1970, 43.4 percent of South Korean males between the ages of 25 and 29 were single, compared to just 9.7 percent of females. By ages 45 to 49, however, the majority of males also found themselves married with just 0.2 percent identifying as single, as compared to 0.1 percent of females. This trend provides further evidence of the tendency for males to marry later than females, a trend that continues to be evident and more pronounced in recent data. While as stated above, 43.4 percent of males ages 25 to 29 were identified as single in 1970, this percentage had risen to 71.0 percent in 2000—an increase of 63.5 percent. However, the most dramatic increase occurred among single males aged 40 to 44 and 45 to 49, whose percentages single increased between 1970 and 2000 by 1,125 percent and 1,100 percent, respectively. The single men in the 40 to 44 group rose from 0.4 percent single in 1970 to 4.9 percent single in 2000, while single men in the 45 to 49 group increased from 0.2 percent to 2.4 percent over the same time period. This is also significant because it represents a larger pool of men who, still single at such a late age, may never marry. The proportions single by sex for all the relevant age groups are shown in Table 3.

These findings suggest some interesting trends among South Korean women. In light of these trends, such as the substantial delay in marriage, the question becomes *why* are women waiting to get married? What is influencing these decisions, and what does this mean for fertility? Currently, three main factors may be put forth as likely explanations: education, individualism, and the economy.

Education levels among women have increased appreciably between the 1970s and 2000s (see Table 4). The percentage of women aged 25 and over reporting that they have completed college or more rose from 2.4 percent in 1975 to 18.0 percent in 2000. Meanwhile, the proportion reporting having only completed elementary school or less dropped from 77.1 percent in 1975 to 30.4 percent in 2000. Higher levels of education among females lead to greater labor force participation and, ultimately, economic independence and empowerment—both of which diminish the incentive for women to marry (Lee 2007). Additionally, women who are educated often seek to marry men who are at least as equally educated, and whose living conditions are either comparable or better than their own (Eun 2003). By raising their personal standards thusly, women are

Table 4. Highest Level of Education Completed by Women Aged 25 and Older (in percentages): South Korea, 1975 and 2000

Education Level	1975	2000
Elementary school or less	77.1	30.4
Junior high school completed	12.1	14.3
Senior high school completed	8.4	37.3
College completed or more	2.4	18.0
Total	100.0	100.0

Source: Chung and Das Gupta 2007

effectively reducing the size of the pool of potential marriage mates.

This tendency toward greater individualism reflects changes in the system of values and norms in South Korea. Youth who are able to secure employment may do so away from the comfort of their parents' home, where they are able to "enjoy consumption" and put off the responsibility of supporting a family of their own (Lee 2009: 59). In this way, the emphasis on the family of procreation weakens as the focus shifts to personal aspirations and achievements. In this grand scheme, marriage likely decreases in importance as women and men focus on education and/or on career-oriented goals. The trend of individualism is also tied to education in another way: the ability to achieve economic independence grants a woman far greater flexibility in her life choices; if she is able to provide for herself, finding someone to "take care of her" no longer needs to be a priority. That is, marriage becomes less of a necessity and more of a choice. This choice is compounded by the increasing "desire by women for greater equality in marital relations" (Jones 2005: 107). Women may delay marriage as they search for a partner willing to accept less traditional gender roles in the relationships. But as Jones points out, "this can lead to... non-marriage if a suitable partner cannot be found" (2005: 107).

Other evidence that may point to increasing individualism is the concurrent rise in the proportion of single-generation households and the decline in the proportion of three-or-more-generation households. According to Lee, "the drop in the number of multi-generational families... did not lead to a surge in nuclear families consisting of parents and their children, but rather resulted in a growth of single-generation

[households]” (2007: 2). It is possible that a greater emphasis on personal goals and desires has led to this trend; young people focused on their own lives and careers could be less likely to want to live with or care for parents or grandparents.

Perhaps the most significant factor in recent decisions to delay marriage has been the East Asian financial crisis of the late 1990s. This economic crisis has been cited as the cause of “the most fundamental change at the societal level” in South Korea (Eun 2003: 583). Essentially, the crisis became tremendously significant when several corporations declared bankruptcy. The most immediate outcome was an extensive loss of jobs and “soaring unemployment” at all ages (Eun 2003: 583). Young people were especially hard hit, and graduates entering the job market for the first time were discouraged when they found very few jobs available. One reason for this was the effort made by corporations to save money by hiring individuals with experience, so as not to have to spend money on training. This effectively eliminated many of the individuals entering the labor force for the first time, which is particularly harmful within the context of the age discrimination in employment that exists in this country (Eun 2003). Essentially, if youths fail to find employment immediately following school, they are less and less likely to find it as they grow older. This has even been known to drive individuals to give up seeking employment entirely (Eun 2003).

Furthermore, part of the economic reconstruction efforts on the part of employers included the transition from “permanent” jobs to part-time and temporary positions. This was instituted to create more jobs, but also resulted in very low job security for employees and the constant risk of being laid off whenever it is deemed necessary. In a

society where a “lifetime job” was a popular concept, this new system has made it extremely difficult for individuals to settle down, causing many young people to delay marriage until they feel they are in a better situation. In such circumstances, it can be a long time (if ever) for that “better” situation to come along. This is consistent with research that shows how “rises in ages at marriage and childbearing tend to be accelerated by the disruptive situation of high youth unemployment,” and which may also result in “perpetuating the commonly observed behavior of [youth] staying in their parental homes until late ages” (Jun 2005: 38).

In many cases, economic uncertainty has proved to be an additional motivation for women to seek jobs as well. Between 1960 and 2004, the female economic participation rate nearly doubled, from 26.8 percent to 49.8 percent (Lee 2007). Research suggests, however, that women in South Korea still remain primarily responsible for caring for the household, regardless of their employment status (Lee 2007). In a typical working day in 2006, for example, South Korean women were estimated to spend an average of 197 minutes on household chores and childcare to men’s average of 72 minutes (Lee 2009); as such, women were devoting over twice as much time a day to these tasks. Balancing these responsibilities *and* a job could very well seem overwhelming, discouraging women from entering into a marriage.

Other important factors include those that would interrupt or eliminate this relationship, such as separation or divorce. In recent years, there has been a substantial increase in South Korea in the number of divorces. Jun states that about half of the annual marriages end up as divorces, giving South Korea “one of the highest divorce

rates in the world” (2005: 42). Factors cited as causes for the rise in the divorce rate include increasing educational attainment, achievement of economic independence, and labor market participation among women, as well as changing family values (Eun 2003). This can have serious implications for fertility, as divorce usually reduces the exposure to the risk of childbearing. However, Jun points out that knowledge of the likelihood of divorce itself can depress fertility, since it creates an environment of uncertainty. Such uncertainty may push a newly-married couple to delay the initiation of childbearing, making it far less likely that the couple will “realize their already small desired family size” (Jun 2005: 42).

Even in light of this high national divorce rate, there is disagreement over whether the effect on fertility is pronounced. Eun explains that while increasing divorce makes the family unstable, “the impact on fertility decline is relatively small” (Eun 2003: 579). One possible explanation may be the recent rise in the number of remarriages for both males and females, which would mitigate the effect of divorce on fertility. Lee claims that “the upsurge in the number of [remarriages] demonstrates that nuptiality patterns have become more diverse than in the past” (2007: 6). More significantly, this diversity also allows for “another chance” at childbearing. Men in their 40s and women in their 30s are cited as having the highest rates of remarriage (Lee 2007), which puts them well within the range of female childbearing ages.

It is clear that marriage patterns and norms have changed a great deal in South Korea between the 1970s and the 2000s. Individuals are waiting longer to marry, with a greater percentage remaining perpetually single. Ultimately, as Eun explains, a decrease

in the marriage rate at the societal level “means less family formation... and can be a significant cause of lower ‘period’ fertility in a society where only childbearing within marriage is accepted” (2003: 579). There is much evidence to suggest that this is the case in South Korea, and that delayed marriage is having a significant effect on the total fertility rate.

Natural Marital Fertility Factors

Throughout the literature, marital fertility is cited alongside age at first marriage as playing a primary role in affecting the total fertility rate of South Korea (Lee 2009, Suzuki 2008, Suzuki 2005). John Knodel and his colleagues (1987) explain that even without some form of deliberate birth control, marital fertility can vary substantially. Therefore, it is not surprising in a society in which extramarital childbearing is socially unacceptable that the level of fertility in marriage would have such an influence on the overall level of fertility.

When analyzing natural marital fertility, one of the first considerations should be those individuals who, due to primary sterility, are unable to bear children. A higher proportion of sterile and subfecund couples would certainly have a depressing effect on the total fertility of a society. In South Korea, the prevalence of primary sterility has recently increased. In 1974, less than 3 percent of women who had been married more than 5 years were without children, and presumed to be suffering from primary sterility (KIFP 1974). Such a low occurrence was not believed to have a notable effect on overall fertility. However, more recently the number of sterile couples has been

increasing while the number of couples in the childbearing ages has been decreasing. While the number of sterile couples rose sharply from 250 thousand in 1990 to 640 thousand in 2003, the proportion of sterile couples has continued to increase from its mid-nineties level of 10 percent (Jun 2005). Over time, it would seem that the number of women who remain childless has gone from negligible to worth recognizing. With over one in every ten couples unable to produce a child, it is far more likely that the depressing effect of sterility will be felt on the total fertility level of the nation.

Another natural marital fertility factor is the duration of postpartum infecundability, which Knodel and associates describe as “the most important proximate determinant of variation in ‘natural’ marital-fertility levels” (1987: 79). The duration of postpartum infecundability is largely a function of the infant-feeding practices of a society. Whereas the exact nature of this relationship was not entirely understood in the 1970s, there was enough evidence to establish a connection between the two. Subsequently, duration of breastfeeding was among the many items included on the 1974 Korean National Fertility Survey. According to data from the 1974 KNFS, women breastfed for 19.2 months on average, with most women breastfeeding for between one to two years. Approximately 16 percent reported breastfeeding for greater than 2 years, while 12 percent breastfed for under one year. Slight differences were apparent by age, with a higher proportion of older women choosing to breastfeed. Furthermore, relationships were identified between the duration of breastfeeding and both age and age at first marriage: older women and those who married before age 20 breastfed longer than younger women and those who married at 20 or later, disparities which were cited

as likely reflecting cohort differences (KIFP 1974). Regardless of age, the “overwhelming majority of women in Korea” reported breastfeeding during the last closed interval, or the interval between either the next-to-last birth and the last birth, or the last birth and the expected delivery date of a current pregnancy (KIFP 1974: 127).

Statistics for the most recent period that I was able to acquire are not directly comparable to those in the comprehensive 1974 survey. Now that more is known about the relationship between breastfeeding and postpartum infecundability, it is more common in contemporary lactation literature to not only focus on the duration of breastfeeding, but to distinguish between “exclusive breastfeeding” (EBF) and “partial breastfeeding” (PBF). Chung, Kim, and Nam define *exclusive breastfeeding* as “feeding by breast milk only with no other liquids or solids with the exception of drops or syrups consisting of vitamins, mineral supplements or medicines” (2007: 225-226). More recently, the mean duration among South Korean women engaging in EBF was 8.0 weeks. Meanwhile, *partial breastfeeding* was defined as “any kind of breast-feeding, including partial or supplemented and exclusive breast-feeding” (Chung, Kim, and Nam 2007: 226). The mean duration among women participating in PBF was found to be 12.0 weeks. As this type of breastfeeding encompasses all combinations of infant feeding behaviors that involve some degree of breastfeeding, including EBF, this average duration is likely to be the most comparable to the 1974 mean duration of 19.2 months. Regardless of the measure used to compare with the 1974 data, it is very much evident that the duration of breastfeeding has undergone a sharp decline between the 1970s and 2000s; in fact, the drop from 19.2 months (or about 77 weeks) to 12.0 weeks

represents a decline of approximately 84.4 percent. Similarly, while breastfeeding in the 1970s was said to be practiced by the “overwhelming majority of women in Korea” (KIFP 1974: 127), the World Health Organization assigned South Korea a breastfeeding initiation rate of 81.3 percent in 2003.

What might account for such a dramatic change? In their 2007 study, Chung, Kim, and Nam used data from the 2003 National Fertility and Family Health Survey to identify characteristics of Korean women that were more likely to be associated with one form of breastfeeding or the other. They found that higher rates of PBF were associated with higher levels of education and prenatal care, while mothers who had blue-collar jobs before marriage or who had premature births were less likely to engage in PBF. Particularly, they found that “women who had a Caesarean section were approximately half as likely to initiate PBC as those who had a normal delivery” (2007: 227).

In terms of EBF, the strongest association was with mothers who had a normal (vaginal) delivery and received more prenatal care, though the more prenatal care the mother had, the higher her likelihood of ceasing EBF earlier. This result was determined to be fairly contradictory, and attributed to “erroneous beliefs” passed on to women from many local maternity units that “after 6 months, breastfeeding is no more beneficial to an infant’s health than simply providing water” (2007: 228). If such a misunderstanding is actually responsible for this trend, it would explain why women who spent more time in prenatal care would be more likely to cease EBF earlier; they would have had more time to absorb this idea.

Interestingly, there is currently a push in South Korea to *extend* the duration of breastfeeding. According to Chung, Kim and Nam, “despite an increased breast-feeding initiation in South Korea recently, newborns are being fed with formula and complementary food too early” (2007: 228). This platform has gone so far as to influence legal action designed to control the dispersion of and utilization of formula. One such measure, enacted in 1991, prohibited the promotion of infant formula to the general public, as well as the provision of free or low-cost supplies to health workers and healthcare facilities (Chung, Kim, and Nam 2007). Presently, not *all* breast-milk substitutes are prohibited, however. Regardless, while the goal of extending breastfeeding duration is put forth in the name of infant health, it directly challenges the goal of increasing the very low rate of fertility in the country; if more women are convinced to effectively breastfeed for longer periods of time, the duration of postpartum infecundability is likely to be extended, possibly further depressing the total fertility rate. At best, any further extension to the period of postpartum infecundability will not *increase* the total fertility rate.

Deliberate Marital Fertility Control

As noted above, decreases in marital fertility are often cited as a central factor in the decline in overall fertility of women in South Korea. Oftentimes, these decreases are the result of an underlying increase in the employment of deliberate marital fertility control. A significant determinant of deliberate marital fertility control is the underlying level of contraceptive usage. An array of contraceptive methods and services has “been

**Table 5. Contraception Usage Among Married Women Ages 15-49 by Method:
1974 and 2008 (in percentages)**

Type of Contraception	1974	2008	% Change
Any method	45.7	80.5	76.1
Any modern method	n/a	66.9	-
Pill	11.0	1.8	- 83.6
IUD	10.4	13.2	26.9
Injection	0.3	n/a	-
Condom	6.8	15.1	122.1
Sterilization (male)	4.3	12.7	195.3
Sterilization (female)	2.3	24.1	947.8
Any traditional method	n/a	13.6	-
Periodic abstinence	0.5	n/a	-
Withdrawal	3.4	n/a	-

n/a = data not available

Note: % Change = (2008 value – 1974 value)/1974 value * 100

Sources: KIFP 1974, Clifton, Kaneda, and Ashford 2008

widely available to South Korean women since the late 1960s when the national family planning program expanded its services nationwide”(Choe and Kim 2007: 42), though their availability was not enough to immediately secure their extensive usage. However, as contraceptive knowledge spread, it became more likely that women would opt to deliberately control their fertility. Additionally, the more contraceptive knowledge women had, the more likely it became that they were aware of the range of effectiveness, and could therefore choose to utilize the most effective method for their particular circumstances and needs. Table 5 clearly illustrates that, as far as contraceptive usage is concerned, there has been a substantial increase between the 1970s and the 2000s among married women ages 15 to 49. However, it is important to note that the data from 1974 excludes women who are either already pregnant or reported to be infecund. Subsequently, the 2008 numbers are certainly inflated because they include *all* married

women. Nevertheless, it is believed that the direction of the trends is correct, though the *extent* of the difference as measured by percent change may not be exact.

For the available data, the most notable development between 1974 and 2008 is the increase in contraception usage of any method: whereas 45.7 percent of married women ages 15 to 49 relied upon any of the available contraceptive methods in 1974, this rate had increased to 80.5 percent by 2008. In other words, as of 2008, only 19.5 percent of married women are not employing any kind of contraception when 24 years prior this could be said for over half of married women. Cho believes this is evidence that “family planning has become a social norm in Korea,” describing the contraceptive practice rate as being at “a saturation point, since effective contraceptives enable women of reproductive age to choose when and how many children they wish to have” (2002: 8-9). The term “saturation” seems to imply that the rate will not increase too far above 80.5 percent. Choe and Kim note that between the late 1990s and 2007, the contraceptive prevalence rate did, indeed, hover around 80 percent (2007). The remaining 20 percent may consist of married women who elect to abstain from contraceptive usage.

By far, the most significant percent change in rate of usage takes place specifically in the utilization of female sterilization. Usage of this method increased from 2.3 percent of married women ages 15 to 49 in 1974 to 24.1 percent in 2008—an increase of 947.8 percent—which makes it the most commonly used form of contraception. The second largest increase, though to a considerably smaller extent, was among women relying on male sterilization for contraception; this rate increased from

4.3 percent of married women in 1974 to 12.7 percent in 2008. Thus, while the usage of male sterilization was higher than female sterilization in 1974, by 2008 the opposite had become true. These recent increases in South Korea in the use of female and male sterilization, by the way, have also occurred in other developed countries of the world.

A particularly interesting change can be found among users of the contraceptive pill: based on the available data, this is the only method to undergo a *decrease* in its usage by married women ages 15 to 49. In 1974, 11.0 percent of married women reported taking a contraceptive pill; by 2008, only 1.8 percent women married women reported doing so, resulting in a decrease of 83.6 percent. Cho describes this trend as an indication that “contraception is no longer considered to be only the woman’s responsibility in Korea” (2002: 10). The concurrent increase in the use of methods which do *not* necessitate daily engagement suggests that this change may also be based upon convenience; that is, perhaps as greater numbers of women sought methods of contraception, they turned to forms that the male could be responsible for, that were long-term, or that were permanent; the usage of condoms, intra-uterine devices, and both male and female sterilization increased during this period of time.

One possible explanation for these dramatic transformations in contraception usage rates among married women—especially in terms of the increase in female sterilization—may be a shift in norms regarding what is considered a “desirable” number of children. In 1974, the average number of children desired among currently married women was 3.2 (KIFP 1974). By 2003, this had dropped to 1.1 among single women in the 20s and 30s (Jun 2005). While this comparison may not be among two identical populations, the

opinions of both groups are considered to be a reasonable reflection of the general opinion on desired family size during their respective year, so the implications of the trend still stand. With such a low average number of children desired, it comes as no surprise that the vast majority (86.3 percent) of married women using some form of contraception state they are doing so for the purpose of pregnancy termination and not child spacing. Just 9.3 percent claimed to have adopted contraception for birth spacing, while 3.9 percent reported using contraception for “other reasons” (Cho 2002).

The change in the desired family size norm is perhaps even more evident among the number of married women aged 15 to 49 with one child who said they did not want more children, which increased substantially from 13 percent in 1974 to about 50 percent in 2003 (KIFP 1974; Jun 2005). Even over the period from 1997 to 2005, the proportion of married women aged 15 to 44 supporting the idea that a married couple “must” have a child decreased from 73.7 percent to just 23.4 percent (Suzuki 2008). This suggests, perhaps, that having children is seen far less as a necessity and more as a couple’s choice. Interestingly and despite these developments, the desire to have any children at all is still strong and has not changed much over the years: in 1974, 13 percent of all currently married “fecund” women reported that they did not desire a child, while 15 percent of married women in 2003 said they would remain childless voluntarily (Jun 2005). This indicates that having a child may well be a deep-seated standard among Korean women, even if the desired number of children and feeling of obligation to do so has declined over the years.

Numerous explanations have been offered for the decrease in the desired number of children. For example, Lee (2009) cites a shift in expectations regarding children’s

utility:

...In the past, [children served as] a means of securing the family labor force, a source of security in retirement, and a succession of the family line. As social security has developed and consciousness on blood relationships has weakened, more emphasis has been placed on children's values as agents of emotional dependence and support. The changes in the values on the qualitative utility of children have affected the quantitative value of their numbers, helping to firmly establish people's views favoring a small number of children in Korea (59-60).

That is, a shift in the focus on the quality of relationships with individual children has affected the overall quantity of children desired by women and couples.

Another possible explanation for the decrease in the average desired number of children is the fallout following the East Asian financial crisis of the late 1990s. As described above, the economic crisis has significant implications for the lives of individuals and families. Of these, uncertainty with respect to finding and keeping a job were paramount. This kind of uncertainty could easily translate into a lowered desired number of children; when individuals are not sure if they will be able to continue caring for themselves, it does not seem illogical that they would not desire to further complicate matters by having numerous children. In this way, children may be viewed as a source of anxiety. This sentiment is echoed in the proportion of South Korean respondents who, in 2006, agreed with the statement that "this society is good for raising a child": only 19 percent (Suzuki 2008). Meanwhile, over three times as many (68 percent) identified "financial difficulty to care and educate a child" as the reason they did not anticipate achieving their expected number of children (Suzuki 2008). In fact, just below 50 percent of unmarried respondents aged 18 to 34 in 2002 identified "the burden of childbearing" as a primary difficulty expected for double-income couples (Lee 2007: 14).

This “burden” would surely be disproportionately felt by the female half of these double-income couples, who would be expected both to contribute to the family income through labor force participation *and* perform the bulk of household chores and childcare tasks. As Suzuki (2005) explains, as women spend increased time on market activities, the opportunity cost of children also increases; time spent on childrearing is time not spent making what may be very much-needed income. Clearly, the wake of such economic difficulty has tempered the number of children most individuals and couples aspire to have.

Additionally, it is likely that this decrease in the desired number of children and increase in contraception prevalence may be attributed in part to the institution of national family planning programs. As stated previously, overpopulation was a central concern in South Korea in the 1960s, and served as the motivation behind instituting a national family planning program “as a major means of population control” (Lee 2009: 61). The policy, adopted in 1962, aimed to reduce the annual population growth and the total fertility rate to specified demographic targets, and was established through successive five-year plans (Lee 2009). Ultimately, this policy met with undisputed success as fertility rates plummeted. Cho attributes the strength of the policy to a number of factors, including its specific and limited goals, the acquisition of resources, the building of an organization process specifically for the demographic goals, and the “development of extensive linkages with other sectors such as the mass media, and private practitioners’ clinics and hospitals” (2002: 5). The fertility levels over the past four decades suggest that this comprehensive and meticulous approach paid off.

While the 1962 family planning program may be cited as responsible for the increasing adoption of contraceptive methods by couples, it may similarly be assigned some of the responsibility for a number of less ideal consequences that typically accompany such rapid fertility decline. For example, since the institution of the policy, South Korea has also witnessed its sex ratio become severely unbalanced and its elderly population increase (Lee 2009). To address these latent effects, the government established the Population Policy Deliberation Committee in 1994, which was tasked with conducting a review of population policy “by focusing on its past accomplishments and future prospects, as well as related socioeconomic problems, in an effort to work out new policy directions and measures for the 21st century” Lee 2009: 62). These “new policy directions” eventually took the form of the following broad goals:

- (1) To maintain the below replacement levels of fertility and to improve morbidity and mortality levels as part of the process of achieving sustainable socio-economic development;
- (2) To enhance family health and welfare;
- (3) To improve the imbalance of sex ratio at birth and to reduce the incidence of induced abortions;
- (4) To tackle the sex related problems of the youth and adolescents;
- (5) To empower women by expanding employment opportunities and welfare services for them; and
- (6) To improve work opportunities and provide adequate health care and welfare services for the elderly (Cho 2002: 3-4).

In 1996, this policy led to the adoption of a new family planning program, which focused on family planning, maternal and child health, sexually transmitted infections, HIV and AIDS, and adolescent reproductive health (Cho 2002). Specifically, it aimed:

- (1) To enhance the quality of contraceptive services to reduce the induced abortion prevalence rate;
- (2) To integrate reproductive health programs, such as family planning, maternal and child health and other social welfare programs;
- (3) To strengthen social and institutional support policies for a balanced sex ratio through improvement of women's social status and gender equality; and
- (4) To expand the scope of the family planning program target population to cover the young unmarried population, to prevent premarital pregnancy (Cho 2002: 4)

Whereas the national family planning program started in 1962 was regarded as largely successful (albeit with some unintended consequences), the family planning program begun in 1996 has been met with mixed results. For example, despite the revised and modernized goals, the TFR in South Korea over the years following the establishment of this policy “continually decreased from 1.56 in 1997 to 1.47 in 2000” (Cho 2002: 7). Cho attributes such an outcome to several problems, such as a lack of unified coordination and data collection, and ultimately the low utilization of the data that are collected (Cho 2002). Regardless, the persistent very low fertility has prompted additional policies, including a series of three plans spanning 2006 to 2020 and known as the Basic Plan for Low Fertility and Aged Society. The first part of the plan covers the period of 2006 to 2010. Its goals included fostering environments in favor of

childrearing, establishing the base for improving the quality of life among the aged society, and securing power for economic growth in an aged society with low fertility. The second part of the plan will take place from 2011 to 2015, and aims to steadily recover a sustainable fertility rate while improving the social system for the older segments of society. Finally, the third part of the plan will cover the period of 2016 through 2020, and endeavors to increase the fertility rate to the average level of OECD countries, as well as accomplishing successful adaption by the aged society (Lee 2006).

Deliberate marital fertility control has played a conspicuous part in affecting changes to South Korea's total fertility rate over the last forty years. At the current level of "contraceptive saturation," it seems that policies to increase fertility will have a dubious effect unless they can alter women's and couple's desires with regards to total family size. To do so would require a complex strategy that extends into numerous spheres, such as the economy and gender relations. Regardless, evidence suggests it is very unlikely that the depressing effect of deliberate marital fertility control will grow stronger over the coming years.

Induced Abortion

While induced abortion is technically a form of deliberate marital fertility control, it will be addressed independently because of its salience in the fertility literature, the controversy that typically surrounds it, and the fact that Bongaarts classifies and analyzes it as a separate determinant.

Obtaining reliable abortion data can be tricky; in many countries, laws restricting or preventing access to induced abortions also complicate efforts to compile accurate statistics on the number and rate of abortions among the women of childbearing ages. As Choe and Kim stress, stringent legal restrictions have not been found to result in a low induced abortion rate, but rather in lower reporting and less reliable data (2007). In South Korea, abortion is “tacitly acknowledged [to be] one of the critical factors affecting fertility levels” (KIFP 1974: 130). As a result, efforts have been made for decades to include abortion-related questions on national surveys in order to garner the most comprehensive data on the subject possible. While under-reporting is still an issue, the data that are available can be very helpful in terms of identifying general trends and changes over time.

With regards to the law, abortion was legalized in 1973 under the Maternal and Child Health law, provided that it took place within 28 weeks from the date of conception and fell into one of the following categories:

- (1) Possibility of fetal impairment (eugenic grounds);
- (2) Infectious diseases of the parent(s);
- (3) Rape or incest;
- (4) Impairment of the mother’s physical and mental health (Cho 2002: 12).

Despite these limitations, abortion in South Korea has been described as widely available in practice (Ganatra 2008). In fact, by 1991, just 59 percent of ever married women aged 15 to 49 knew that the law only allowed for induced abortions under the

particular conditions just cited (Choe and Kim 2007), suggesting that over 40 percent of woman believed that anyone who wanted an abortion would be able to have one.

Regardless of legal status, there has been considerable change in trends surrounding induced abortions between the 1960s and 2000s. One indicator of this change is the precipitous decline in the percent of pregnancies that ended in induced abortion, which declined from 43 percent in 1963 to 24 percent in 2003 (Choe and Kim 2007). Compared to the proportion of pregnancies that end in induced abortion worldwide, which is estimated at approximately 10 percent, 24 percent is still quite high. This considerably higher rate is likely attributable to the strong stigma that exists against having extramarital births. According to Lee (2009), as of 2007 births from legally married couples accounted for approximately 98.5 percent of all births. However, this does not mean that only 1.5 percent of conceptions take place out of wedlock. Instead, because of the shame and social sanctions that accompany extramarital pregnancies, a large proportion of unmarried pregnant women decide to have an abortion—as of 2005, about 90 percent (Choe and Kim 2007). Subsequently, a high rate of extramarital conception in conjunction with a strong anti-extramarital pregnancy norm would seem to explain why the induced abortion rate in South Korea is so much higher than the estimated global level.

It is important to note that the general decline in South Korean induced abortions between 1963 and 2003 masks an initial increase in the number of abortions over time and by age. This is illustrated in Figure 2, which presents data on induced abortion rates (the number of abortions per 1,000 married women) by age category for selected years

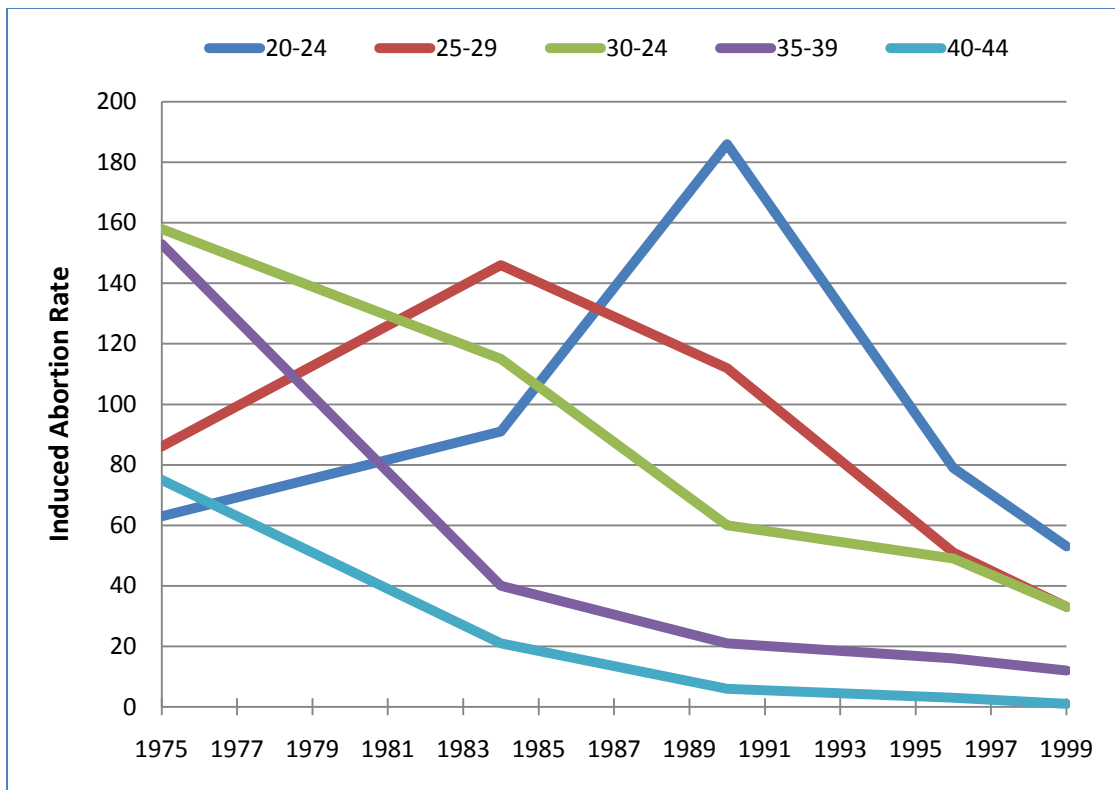


Figure 2. Changes in Induced Abortion Rates by Age Category: South Korea, 1975 to 1999

Note: Induced abortion rate = Number of abortions per 1,000 married women

Source: Choe and Kim 2007

between 1975 and 1999. Among women in the 20-24 and 25-29 age groups, there is a substantial increase in the induced abortion rate between 1975 and 1990, which then undergoes a similarly steep decline between 1990 and 1999. Meanwhile, among women in the three older age categories, the induced abortion rate consistently declines over the 1975 to 1999 period.

Another indicator of change in trends surrounding induced abortion can be found in the distribution of pregnancy termination between 1975 and 2003 (see Table 6). Between 1979 and 2003, the greatest difference in terms of both percentage points and percent change takes place among pregnancies that end in induced abortion, which

Table 6. Type of Pregnancy Termination Reported in National Fertility Surveys (in percentages): South Korea, 1979 and 2003

Type of Termination	1979	2003	% Change
Live birth	51	66	29
Spontaneous abortion or stillbirth	7	10	43
Induced abortion	43	24	-44
Total percent	100	100	n/a
Percentage of total pregnancy wastage	50	34	-32

Note: % Change = (2003 value – 1975 value)/1975 value * 100

n/a = not applicable

Source: Choe and Kim 2007

decreases from 43 percent of pregnancies to 24 percent. The increase of 15 percentage points among pregnancies ending in live births suggests that, ultimately, the majority of pregnancies that no longer result in induced abortion are now ending in live birth, rather than spontaneous abortions or stillbirths. A likely explanation for this change is the concurrent rise in contraceptive usage over this period of time. By adopting a form of contraception and therefore exerting greater control over their fertility, fewer women find themselves coping with an unplanned and/or unwanted pregnancy. That is, having the option of employing contraception would mean that in many cases, pregnancies were deliberate and desired, and therefore considering an induced abortion unnecessary. A negative relationship between the rate of induced abortion and contraception usage has also been found in other research (see Shears 2002). This suggests that, in South Korea, induced abortion and contraception are not two parts of the same trend of increasing family limitation, as Knodel and his colleagues (1987) found was the case in Thailand. Instead, the various available methods of contraceptives function as *alternatives* to induced abortion, giving many women greater agency in terms of planning pregnancies,

and relegating induced abortions for them to the place of “if all else fails.” However, with such a comparatively high rate of abortions, it may be deduced that for many women in South Korea, a “limited understanding of the properties of different contraceptive methods [leads them to] choose inappropriate methods and/or fail to use them effectively” (Choe and Kim 2007: 50).

While the rate of induced abortions may have declined over the years, relationships between certain characteristics and the likelihood of obtaining an induced abortion have persisted. Namely, religious affiliation has been shown to be related to the practice of induced abortion. Chung, Kim, and Nam (2007) found that Christian women in South Korea with only sons or with one daughter and one son were less likely than Confucian women with the same sex distribution of children to have had an induced abortion, but that Buddhist women were not significantly different from Confucian women in their induced abortion practices. This may be due, in part, to the belief in some Christian religions that life begins at the moment of conception; from this perspective, ending a “life” via induced abortion is akin to murder. It is interesting that this relationship was only found among the women who had only sons, or a son and a daughter; among women with only daughters, there was no significant difference in usage of induced abortion by religion. It is also interesting to note that this relationship may be viewed as inconsistent with results from 1974 (see Figure 3) which show two Christian faiths with slightly higher use of induced abortion than women with no religion, or all women in general. Unfortunately, women affiliated with the Confucian tradition are not specifically identified in this survey. Furthermore, it should be noted

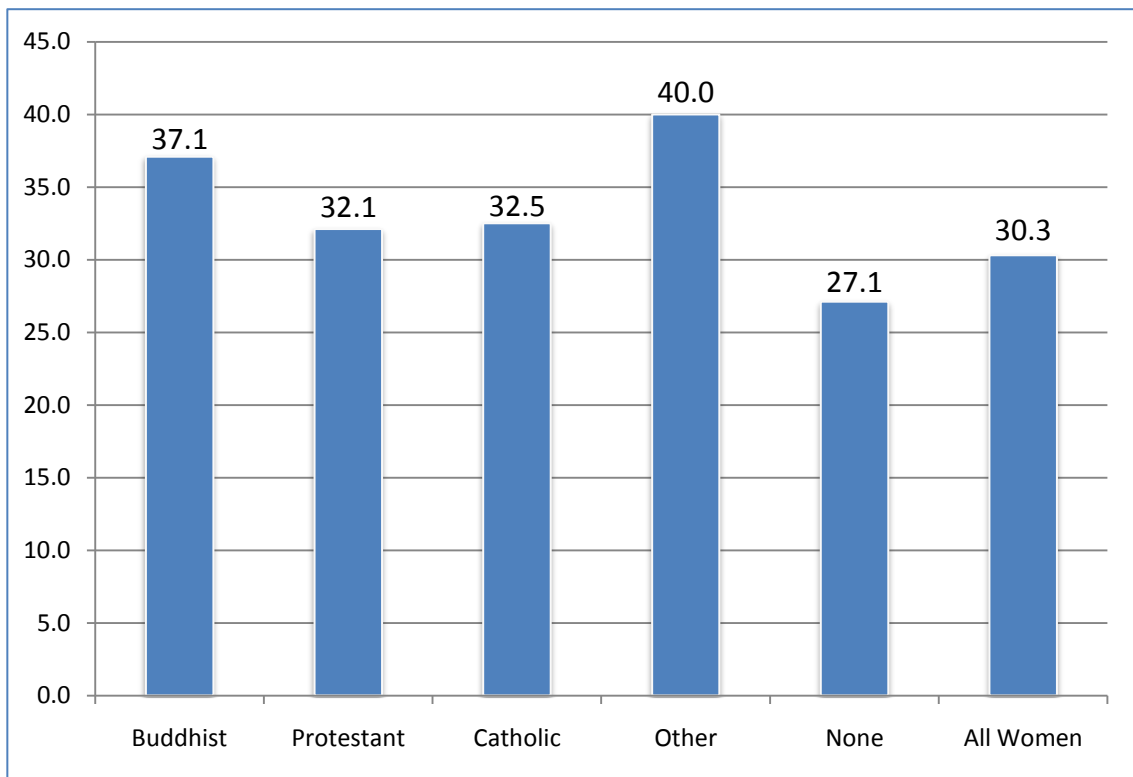


Figure 3. Percentage of Ever-Married Women Who Report Having Had at Least One Induced Abortion, by Religion: South Korea, 1974

Source: KIFP 1974

that “the slightly higher use among the Christians... may be due to their more favorable educational composition and greater urban residence” (KIFP 1974: 137); in other words, the relationship between religion and abortion may actually be spurious, or the result of an interaction with another factor.

Another characteristic that is typically linked with induced abortion is son preference, which is an issue in many other Asian countries. In fact, there is sometimes even a link between son preference and religion, such as in the case of Confucianism, which includes traditions of ancestor worship that stipulate certain responsibilities for sons. Regardless, in cases of very strong son preference, induced abortion is often relied

upon to abort female fetuses. South Korea is an example of a society with this kind of very strong preference, due in large part to its system of patrilineal descent. Chung and Das Gupta explain:

The lineage was continued through the line of the eldest son in each generation, and other sons in each generation would start their own sub-lineages. This meant that the eldest son had the burden of caring for all male ancestors, and it was especially important for him to bear a son to continue the male descent line. Women were severely marginalized by these strict rules of patrilineal kinship and inheritance, which placed the father and the son in the public sphere and relegated women to the domestic sphere...Only sons could care for their parents in this life and in their afterlife. A woman's primary duty was to bear sons for her husband's lineage (2007: 762).

Subsequently, induced abortion became a means for a woman to increase the likelihood of bearing a son; if she aborts a female fetus, this enhances her probability of having a male birth while simultaneously only having one or two children.

A popular indicator of son preference is the sex ratio at birth (SRB), or the number of live male births for every 100 live female births. In nature, approximately 105 human males are born for every female; because males have higher age-specific mortality rates at every age, the sex ratio typically balances out by the 20s and 30s (so that there are relatively equal numbers of males and females), and then continues to decrease across the lifespan. When an SRB deviates considerably from 105, it is a good indication that some tampering with the biology may well be taking place. By examining the SRBs in South Korea over the past 30 years (see Table 7), it becomes evident that, as early as 1980 to 1985, some form of intervention was resulting in a higher number of male births than the "biological norm." By 1985, the SRB for all births was 109.5. This ratio continued to increase precipitously into 1990 when it

Table 7. Sex Ratio at Birth by Birth Order from Vital Statistics Reports: South Korea, 1974 to 2000

Year	Total	1st Births	2nd Births
1974*	106.5	107.3	107.8
1980	105.3	106.0	106.5
1985	109.5	106.0	107.8
1990	116.5	108.5	117.0
1995	113.2	105.8	111.7
2000	110.2	106.2	107.4

*Retrospective births from survey data

Note: Sex ratio at birth = number of male live births per 100 female live births

Sources: Park and Cho 1995; Cho 2002

reached 116.5 for all births, but then began to decline. As would be expected in a society exhibiting son preference, the SRBs for second births are consistently higher than for first births in every year. In 1990, the SRB for the second birth is considerably higher—117.0 compared to just 108.5 for the first birth. This trend is illustrative of women’s increased efforts on the second birth to ensure that they have a son.

It is particularly notable that the SRBs in South Korea have been declining since the early 1990s. In fact, South Korea is often touted as an example where the SRB has begun to return to normal due to comparatively successful efforts to “rebalance” the sex ratio. Explanations for this decline include many factors of social and economic change: industrialization and urbanization; the ability to obtain livelihoods and social status independently of lineage membership; increased participation of women in the labor force; better employment and educational opportunities for women; the development of relationships between parents and children based on “affect rather than by rigid rules of gender and birth order” (Chung and Das Gupta 2007: 777); the establishment of

retirement savings for old age security; laws allowing women rights and responsibilities within their natal families after marriage; laws benefitting female-headed households; a “Love your Daughters” media campaign; a social movement for self-regulation of medical professionals for “immoral medical services such as the performance of fetal sex determination procedures” (Cho 2002: 22); non-governmental campaigns on the negative effects of sex-imbalances in society; the prohibition of prenatal sex determination, as well as stiff penalties for the violation of this law; etc. (Ganatra 2008; Chung and Das Gupta 2007; Cho 2002).

Despite the evident improvement, the sex ratio is still higher than the “biological norm.” This indicates that, according to Chung and Das Gupta, “the belief that one must fulfill the filial duty to continue the male family line remains significant” (2007: 778). Thus, even though the reliance on abortion as a method of deliberate fertility control has declined somewhat over the past thirty to forty years, it is still relatively high, and its effect on fertility cannot be disputed. Because of this, Jun makes an interesting point:

[An] individual couple’s ability to fit actual fertility with their desired family size will in all likelihood improve in the phases of the second [fertility] transition and correspondingly, unwanted fertility may become a rare, anachronistic phenomenon. However, the exception to this trend is highly plausible in cases where the Korean government puts a severe restriction on access to the abortion procedure, under the slogan of maternal protection and the repair of the sex ratio at birth imbalances (2005: 37).

Jun’s comment highlights the point that as long as induced abortion maintains a measurable depressing effect on fertility levels, there remains the potential for the government to manipulate access to abortion in favor of increased fertility. How likely

this scenario is of actually playing out is debatable, but in extreme circumstances, it is certainly possible.

This chapter has examined the proximate determinants in South Korea and how they have changed over time. Each determinant was examined in depth, one by one. In the next chapter, I will undertake a similarly thorough investigation of marriage and marital disruption, natural marital fertility factors, deliberate marital fertility control, and induced abortion in the United States.

CHAPTER V

THE PROXIMATE DETERMINANTS OF FERTILITY IN THE UNITED STATES

As with the previous chapter dealing with South Korea, this chapter adopts the style of Knodel, Chamrathirong, and Debavalya's 1987 study of fertility decline in Thailand, focusing on the United States to show how the proximate determinants have affected the course of U. S. fertility over time. I undertake an in-depth look at the four primary proximate determinants of U.S. fertility during the 1970s and the 2000s.¹

Patterns of change in the fertility levels of the United States over recent decades have been far more variable than the consistent—albeit sharp—patterns of change experienced in South Korea. Whereas the post-World War II “Baby Boom” produced birth rates of approximately 3.6 births per woman in 1955, by the early 1970s the rate had decreased to just 1.8 births per woman, where it remained through the mid-1980s before rising again to approximately two births per woman in the early 1990s (Mosher and Bachrach 1996). Suzuki (2008) asserts that “countries that have avoided lowest-low fertility should be seen as exceptional and requiring explanation” (2008: 36). Accordingly, these trends, relative to the experiences of other developed nations, raise questions about the “exceptionalism” of the United States. Lesthaeghe and Neidert elaborate:

¹ For a more comprehensive description of Knodel, Chamrathirong, and Debavalya's work, please refer to Chapter II. Furthermore, for a brief discussion of the benefits of conducting case studies, the process of selecting this country for investigation, or a review of the proximate determinants, please refer to Chapter IV.

The American total fertility rate now towers high above those of many of its industrial competitors, and especially above those of the EU-25 and Japan. Add to this that the United States is still taking in more immigrants, and the conclusion is clear: the U.S. population will continue to grow, its aging will be less pronounced, and the country will easily avoid the negative population growth momentum that many other industrialized countries are about to face as a result of 25 years of “lowest-low” fertility—that is, TFRs below 1.5 children (2006: 670).

In light of this evidence, the question becomes *why* has the experience with fertility levels in the United States been so markedly different from other, similarly industrialized nations? By undertaking a Knodel et al.-style study of the proximate determinants of fertility in the United States, I will be able to address this question.

Marriage and Marital Disruption

The 1960s and 1970s were decades of great social and normative change in the United States. One area in which this is particularly evident is that of marriage and family formation, where changes during this period have been described as “fast and furious” or “in the epic terms of transformation and revolution” (Estin 2008). In the broadest terms, marriage has witnessed a shift from being a single primary model to being defined by “many different types of marriage and marriage-like relationships [with] important social and legal consequences” (Estin 2008). Among the relationships that have become more common are cohabiting couples with or without children, single parents, gay or lesbian couples with or without children, and all manner of step families. At the same time, as these family forms have gained more prominence, the divorce rate has increased precipitously and, moreover, a growing portion of couples opt to either delay or forgo marriage entirely. All of these changes have been facilitated by a

constantly-evolving legal context, a complex network of laws and norms. That is, as Estin (2008) explains, “our institutions of marriage and family life reflect the broader and deeper values of our society.” Thus, by examining certain significant legal developments over recent decades, it becomes possible to gain a more comprehensive understanding of what some consider to be the “deinstitutionalization” of marriage (Cherlin 2004).

The first of the relevant rulings, arguably, took place in 1965 when the Supreme Court determined in *Griswold v. Connecticut* that a law prohibiting married couples from using contraceptives was in violation of their constitutional marital privacy (Estin 2008). By stipulating that married couples may rightfully opt to utilize birth control, this ruling may have initiated a separation between the act of marriage and the act of childbearing. Furthermore, if married couples could, in theory, be engaging in sexual activities for purposes other than procreation, it was not a far leap to the notion that *anyone* could be engaging in sexual activities for such reasons. Research by Finer suggests that this was, in fact, the case. He found that, since the 1950s, there has been a trend toward a higher proportion of individuals experiencing premarital sex (see Table 8), despite the popular belief that pre-marital sex is a recent phenomenon. Instead, even among those who turned age 15 between 1954 and 1963, just under half were having pre-marital sex by age 20. By the time the 1994-2003 cohort of 15-year-olds turned 20, this number had risen to just fewer than 75 percent. Another telling statistic is the median age at first premarital sex, which declined from 20.4 for the 1954 to 1963 cohort

Table 8. Percentage Experiencing Premarital Sex by Exact Age According to Cohort:
United States, 1954 to 2003

Cohort Turning 15 in:	Percent who had premarital sex by exact age:								Median age at first premarital sex
	15	18	20	25	30	35	40	44	
All	16	58	75	89	93	94	95	95	17.4
1954-1963	4	26	48	73	82	84	85	88	20.4
1964-1973	6	39	65	86	91	93	93	94	18.6
1974-1983	10	50	72	88	92	93	93	NA	18.0
1984-1993	13	59	76	89	94	NA	NA	NA	17.3
1994-2003	14	54	74	NA	NA	NA	NA	NA	17.6

NA = not applicable

Source: Finer 2007

of 15-year-olds to 17.3 among those who turned 15 between 1984 and 1993, before rising slightly to 17.6 for the 1994 to 2003 cohort (though because the data for the latter two groups are incomplete, it is possible that these numbers could still change—albeit slightly). Nevertheless, the trend is clear: a significant proportion of individuals have engaged in premarital sex since as early as the 1950s, and this proportion has increased significantly over time.

As Finer states, these results “indicate that premarital sex is highly normative behavior,” which is “not surprising in an era when men and women typically marry in their mid-to-late twenties” (2007: 76,78). In fact, this increase in premarital sexual activity was accompanied by a similarly dramatic increase in the average age at first marriage, as well as a notable decrease in the proportion ever marrying. Whereas until the 1960s, the overall trend in the United States was toward earlier marriage, it was at this point that the average age at marriage began to rise (Schoen and Canudas-Romo 2005). As illustrated in Table 9, the average age at marriage for females rose from 20.1

Table 9. Average Age at First Marriage and Proportion Ever Marrying by Sex:**United States, 1960 to 2000**

Year	Average Age at Marriage		Proportion Ever Marrying	
	Female	Male	Female	Male
1960	20.1	22.2	0.977	0.976
1965	20.4	22.1	0.982	0.981
1970	20.6	22.2	0.972	0.981
1975	21.3	23.3	0.954	0.958
1980	22.2	24.2	0.916	0.921
1985	22.5	24.5	0.904	0.883
1990	23.0	25.0	0.890	0.862
1995	24.3	26.0	0.897	0.865
2000	24.4	26.1	0.886	0.852

Source: Schoen and Canudas-Romo 2005

years in 1960 to 24.4 years in 2000—an increase of 21.4 percent. Males experienced a slighter increase of 17.6 percent from 22.2 in 1960 to 26.1 in 2000. Meanwhile, the proportions of females and males ever marrying declined by 9.31 percent and 12.7 percent, respectively, with 88.6 percent of females and 85.2 percent of males marrying at some point as of 2000, compared to 97.7 percent for females and 97.6 percent of males in 1960. Perhaps a relationship can be drawn among these trends: with premarital (and thus non-marital) sex more normative, some individuals may find that there is less incentive to marry.

There is an additional outcome emerging from increased premarital sex, namely, an increase in non-marital births (Mosher and Bachrach 1996). Another ruling pertinent to family formation addresses this issue: *Levy v. Louisiana* in 1968 resulted in the Supreme Court overturning Louisiana’s law denying “illegitimate” children the right to recover after their mother’s wrongful death, and extending Due Process and Equal

Protection to children born out of wedlock. Essentially, the Supreme Court maintained that “classification on the basis of legitimacy was invidious and unconstitutional” (Estin 2008). This was just part of the movement to combat the “historic stigma attached to illegitimate birth” (Estin 2008), and ultimately its effect may be assessed in part by considering how the prevalence of non-marital births has changed since 1968. As Cherlin points out, “marriage is no longer the nearly universal setting for childbearing that it was a half century ago” (2004: 849). Moreover, as is evident in Figure 4, while significant increase from the 3.8 percent born outside of marriage back in 1940.

Nonetheless, the 1970 percentage had increased substantially by 2007 to 29.7 percent of

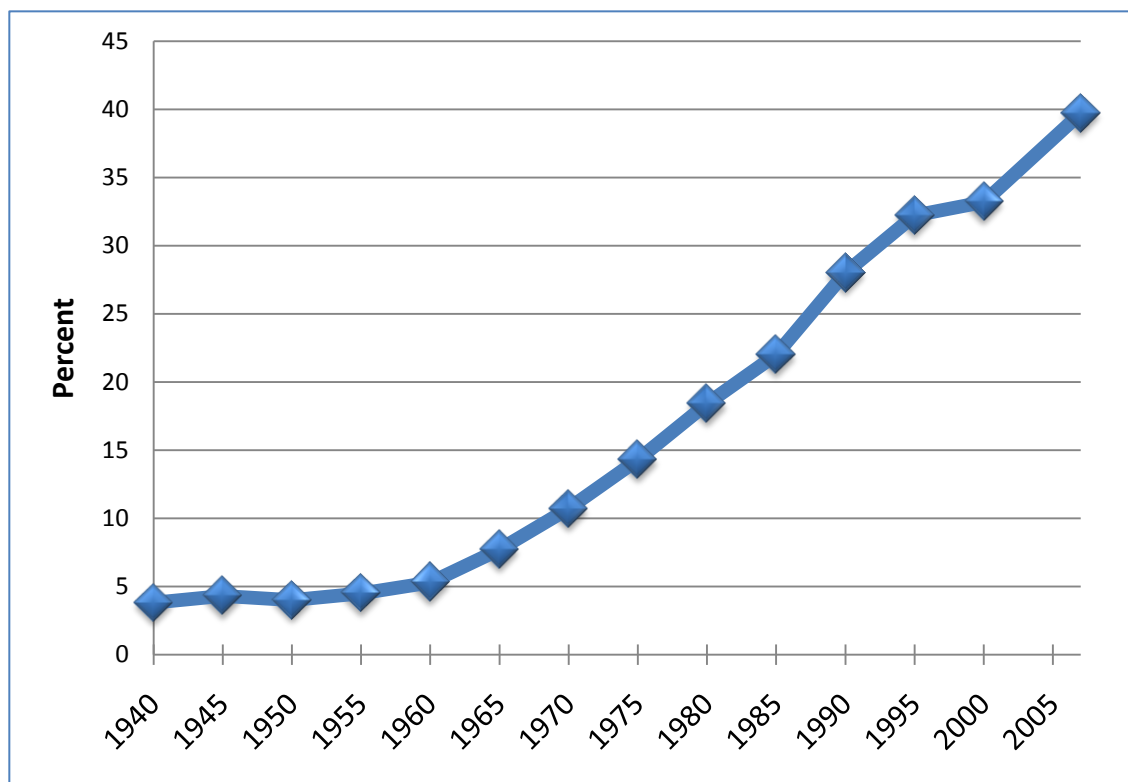


Figure 4. Percent of Births to Unmarried Women in the United States: 1940-2007

Source: National Center for Health Statistics 2003, Ventura 2009

just 10.7 percent of births in 1970 were to unmarried women, this by itself was a all births: an increase of 271 percent. Put another way, nearly 4 in 10 births in 2007 were to unmarried women, representing a percentage of births more than double what it was just twenty-five years prior (Ventura 2009). According to Ventura, the period of the mid-1990s to 2002 was regarded as one of “relative stability” in nonmarital childbearing, but since then the measures have “risen sharply” to what she describes as “an historic peak” (2009: 6). This marked rise has occurred across racial and Hispanic origin groups, though much of the increase has taken place among women aged 20 and older. The new age distribution of nonmarital births is notable when it is considered that nonmarital childbearing is often associated with teenagers. In fact, nonmarital births to teenage women constitute less than one-fourth of recent total nonmarital births Ventura 2009). Even in light of this remarkable change, births to unmarried mothers are still considered a cause for concern based on the increased risk of low birth weight, preterm birth, dying in infancy, and ultimately living in poverty as compared to babies born to married women (Ventura 2009).

The substantial rise in nonmarital births has been attributed to many factors, including the aforementioned increased age at first marriage and a shift in attitudes--over time, the societal disapproval faced by unmarried mothers has diminished considerably (Ventura 2009). These changes have occurred despite political efforts to combat such them, such as the 1996 Federal Welfare Reform Act which necessitated that states work toward reducing the number of births to unmarried mother, and actually establish specific annual numerical goals (Gray, Stockard, and Stone 2006). However, one factor

that is commonly cited to have influenced the rise in nonmarital births is the increase in cohabitation (Ventura 2009). For many, non-marital cohabitation is now viewed as “a normal part of the life course” (Popenoe 2008a: 3). As illustrated in Figure 5, the number of unmarried couples was over 14 times greater in 2007 than it was in 1960, representing an increase of over 1,368 percent. What has been driving such remarkable growth? Popenoe links this growth to the “sexual revolution that began in the 1960s, a revolution which essentially gave premarital sex a social stamp of approval” (2008a: 4). Over time, the social approval of premarital sex extended into a virtual “consensus among most Americans that cohabitation is much like a trial marriage or a step expected

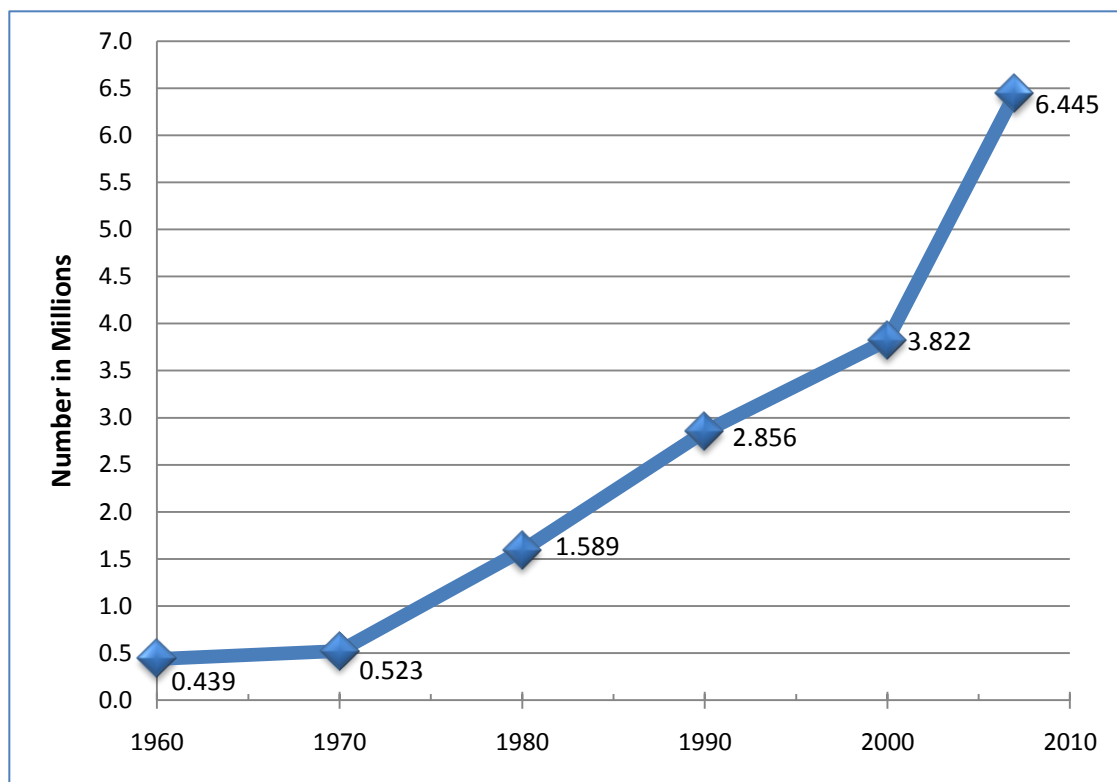


Figure 5. Number of Cohabiting, Unmarried Adult Couples of the Opposite Sex in the United States: 1960-2007

Source: Popenoe 2008b

to lead to marriage” (Raley 2001: 59). This consensus is evident in changing attitudes, such as those revealed by the nationally representative *Monitoring the Future* survey of high school seniors, conducted by the Institute for Social Research at the University of Michigan. The percentage of high school seniors who “agreed” or “mostly agreed” with the statement that “it is usually a good idea for a couple to live together before getting married in order to find out whether they really get along” increased substantially from 32.4 percent of girls and 44.9 percent of boys in the 1976 to 1980 period to 57.6 percent of girls and 64.5 percent of boys in the 2001 to 2006 period. Despite the obvious trend toward greater acceptance—girls’ approval increased by 25.3 percentage points, and boys’ by 19.6—it is particularly interesting to note that since the 1996 to 2000 period, there has been a slight decrease: girls decreased from 59.1 to 57.6, while boys decreased from 65.7 to 64.5. Unfortunately, it is too early to tell if this decline is temporary, or is an indication of a greater trend. Even so, the growth in the approval of cohabitation between the 1970s and 2000s is unmistakable.

The growing approval of cohabitation has been accompanied by greater legal and political recognition. Cherlin states that, “to be sure, cohabitation is becoming more institutionalized,” citing the greater rights and responsibilities being granted to cohabiting couples by some states and municipalities as evidence of this institutionalization (2004: 850). Yet, interestingly, the “elaboration of rules or standards in state or federal laws” to address issues of cohabitation has not necessarily matched the significant growth in the cohabitation rate among couples (Estin 2008). For example, laws still vary considerably from state to state in terms of the conditions that need to be

fulfilled for a couple to be formally recognized. Typically, requirements center around a particular duration of the cohabitation, the existence of a sexual relationship, and a shared address (Popenoe 2008a). What is particularly noteworthy about cohabitation laws everywhere in the United States, however, is that there are “no specific procedures...for getting into it, and none for getting out” (Popenoe 2008a: 12). Indeed, this represents the starkest contrast to legally sanctioned marriages. As Cherlin explains:

...marriage still requires a public commitment to a long-term, possibly lifelong relationship. This commitment is usually expressed in front of relatives, friends, and religious congregants. Cohabitation, in contrast, requires only a private commitment, which is easier to break. Therefore, marriage more so than cohabitation, lowers the risk that one's partner will renege on agreements that have been made (2004: 854).

Yet Cherlin goes on to predict that, over time, differences in legality between the two types of relationship will become minimal (2004: 855). Whether or not this actually becomes the case in the United States, the current differences have interesting implications for fertility.

It seems logical to draw a connection between the greater number of individuals living together unmarried and, presumably, engaging in sexual relations, and the greater number of nonmarital births. Indeed, it has been found that “many infants are...born to couples in cohabiting relationships: according to the 2002 NSFG, about 40% of recent nonmarital births were to cohabiting women” (Ventura 2009: 6). This is a significant change from earlier decades, in which differences in fertility expectations and behavior were arguably the most significant distinction between marriage and cohabitation (Raley 2001). In fact, research by Raley suggests that cohabitation may be viewed, more and more, as an alternative to marriage rather than as a prelude. This is supported by a

decreasing proportion of pregnant cohabiters who decide to marry prior to the birth of their child (Raley 2001). If this is the case, it suggests that changes in the rates of marriage versus cohabitation may well have little effect on overall fertility, and that couples will make fertility decisions independent of decisions relating to marriage.

One factor that, for some, has become more and more of a deterrent to getting married in the first place is the rate of divorce. This is another area in which trends have been largely dictated—or at least enabled—by legal context. A landmark in the evolution of divorce was reached when Governor Ronald Reagan of California signed the nation’s first no-fault divorce bill in 1969. His intention was to “eliminate the strife and deception often associated with the legal regime of fault-based divorce,” but he also ended up stripping marriage “of its legal power to bind husband and wife” (Wilcox 2009: 81). That is, by permitting no-fault dissolutions, couples may now negotiate the terms of their divorce, but it also essentially granted spouses the power to end their marriages, as Wilcox put it “for any reason—or for no reason at all” (Wilcox 2009: 81). The period of time surrounding this decision is often referred to as the “divorce revolution,” primarily because of the sharp increase in the rate of divorces taking place: between 1960 and the early 1980s, the divorce rate more than doubled (2007). As illustrated in Table 10, this trend is also evident in the percentage of the U.S. population age 15 and older that reports being “currently divorced” (i.e. divorced at the time of the respective Current Population Survey, conducted by the U.S. Census Bureau). The percentage of divorced males has increased from 1.8 percent in 1960 to 8.6 percent in 2007, representing growth of nearly 378 percent; meanwhile, females experienced nearly

Table 10. Currently Divorced Population Age 15 and Older by Sex (in percentage):**United States, 1960 to 2007**

Year	Males	Females
1960	1.8	2.6
1970	2.2	3.5
1980	4.8	6.6
1990	6.8	8.9
2000	8.3	10.2
2007	8.6	11.0

Source: Popenoe 2008b

as substantial an increase from 2.6 percent in 1960 to 11.0 percent in 2007, reaching a higher level but at a slightly lower increase over time of about 323 percent. As divorce has grown more common, there has also been evidence of a growing acceptability of marital dissolution. Cherlin comments that “although relatives and friends will view a divorce with disappointment, they will accept it more readily than their counterparts would have two generations ago” (2004: 855). Explanations for the trend vary, but Estin suggests that the higher rates over time may actually be a simple reflection of higher standards among individuals regarding marital happiness and success, as well as a greater emphasis on “freedom to form and leave unions and further... individual happiness” (Estin 2008). Regardless of the cause, the effect on fertility is straightforward: with marriages becoming less stable or reliable, it is possible that individuals may opt to delay or forgo bearing children in order to determine whether the marriage seems like it will last.

These findings suggest some interesting trends among American women. As with the case in South Korea, the question then becomes *why* are women waiting to get

married? Why are couples cohabiting with greater frequency, and what are the incentives for having a child outside of marriage? Currently, two main factors serve as likely explanations: gender roles and individualism.

The early 1960s were also known for the marked increase in the intensity of the women's movement. The ability to leave broken marriages and greater access to contraception (see section below) gave women freedoms they had not possessed previously, and this newfound freedom spread into other areas of their lives. For example, as Cherlin notes, "although women continued to do most of the housework and child care, the roles of wives and husbands became more flexible and open to negotiation" (Cherlin 2004: 852). Popenoe adds the following:

At the same time, the sexual revolution was enhancing the gender revolution which was bringing greater equality to women, especially in the workplace. Being less impelled to marry at a young age, women entered jobs and careers in ever larger numbers and marriage and childbearing were increasingly delayed. The delay was enhanced by women's greatly increased entry into higher education, desired not only in its own right but often required by the jobs and careers that women aspired to (2008a: 6).

Indeed, the opportunity to achieve higher levels of education and aspire toward more prestigious and higher-paid occupational positions certainly affected women's decisions to marry and bear children, usually to the effect that they were delayed or relinquished altogether. Education and employment also gave women additional freedom: the freedom of economic independence, meaning that they no longer were forced to rely on men for financial stability. This often meant the ability to support one's self, or to leave a bad marriage as necessary, and yet to "still remain economically viable through their new access to jobs" (Popenoe 2008a: 6).

While increased access to education and career opportunities certainly have affected fertility, they have functioned in tandem with the increasing focus on individualism. Cherlin states that the last few decades of the century were characterized by what he calls “an ethic of expressive individualism” (2004: 851). He explains as follows:

...An even more individualistic perspective on the rewards of marriage took root. When people evaluated how satisfied they were with their marriages, they began to think more in terms of the development of their own sense of self and the expression of their feelings, as opposed to the satisfaction they gained through building a family and playing the roles of spouse and parent. The result was a transition from the companionate marriage to what we might call the *individualized marriage* (2004: 852).

This sort of “pure relationship” is “not tied to an institution such as marriage or the desire to raise children,” but “exists primarily in the realms of emotion and self-identity” (Cherlin 2004: 853). In other words, people have increasingly begun to enter relationships for the benefits and fulfillment they can receive from them. If they believe children to be such a benefit, then they have children; if it so happens that some individuals do not perceive children to be a benefit they desire, then they do not have children. Marriage and fertility have, in this way, evolved into options rather than required or guaranteed stages in the life course. Instead of being a step one takes to establish oneself at a young age, marriage is now more “a status one builds up to, often by living with a partner beforehand, by attaining steady employment or starting a career, by putting away some savings, and even by having children...It is something to be achieved through one’s own efforts rather than something to which one routinely accedes” (Cherlin 2004: 855). Individuals want to feel secure that they have reached

certain goals—whether personal or financial—before “settling down.” Accordingly, the result is often that marriage and fertility are sacrificed, or at least delayed, in this process.

Such notable changes to the institution of marriage since the 1970s, and the concomitant developments in cohabitation, non-marital births, and divorce, are likely to have exerted a similarly notable influence on the total fertility rate in the United States. Yet during the vast majority of 1961 through 1975, the decline in marital fertility was cited as the “dominant factor” influencing the continuous decline in the TFR. Specifically, 83 percent of the decline was attributed to marital fertility rates, while just 16 percent was accounted for by changes in marital status, with changes in non-marital fertility registering but a “negligible effect” (Gibson 1976: 252). In other words, the changes to fertility taking place within marriage were having a much more significant effect on overall fertility levels than changes in marriage patterns. Thus, before the weight of changes to marriage and marital disruption can be fairly assessed, trends in both natural marital fertility and deliberate fertility control must be thoroughly considered.

Natural Marital Fertility Factors

Unlike in South Korea, nonmarital births in the United States are being met with lower levels of stigma over time. Subsequently, as discussed above, there has been a significant increase in the prevalence of births outside of marriage over past decades. This might seem to suggest that the influence of marital fertility on the total fertility rate

would be lessening over time; accordingly, throughout the literature, decreasing levels of U.S. marital fertility have been identified as having a notable impact on the TFR.

Once again, it is logical to begin a discussion of natural marital fertility by addressing the population of individuals who, due to primary sterility, are unable to bear children at all. Lundquist, Budig, and Curtis point out that among American women, childlessness has doubled in the last 3 decades, and this growing proportion of women who are childless at the end of their childbearing year “has sparked research into the causes and consequences of this trend” (2009: 741). By examining the proportion of women who suffer from impaired fecundity, it becomes possible to separate women who deliberately (or accidentally) remain child-free from those who are unable to conceive. Chandra and colleagues elaborate on the difference between voluntarily and “nonvoluntarily” childless women:

Most childless women 15–44 years of age are “temporarily childless,” meaning that that they expect to have one or more children in the future. Voluntarily childless women are women who are fecund (physically able to have a birth) and expect to have no children in their lifetimes or they are surgically sterile for contraceptive reasons. Nonvoluntarily childless women are those who expect to have no children in their lifetimes, and either have impaired fecundity or are surgically sterile for reasons other than contraception (2005: 7).

In 2002, 42 percent of women aged 15 to 44 were childless. Of these, 33 percent qualified as temporarily childless, with 6.2 percent voluntarily childless, and 2.5 percent nonvoluntarily so (Chandra et al. 2005). Table 11 identifies married women according to fecundity status by age and parity between 1976 and 2002. The designation *fecund* refers to the ability of the woman to have a live-born child at the time of the interview (Mosher 1980). In 1976, 43.9 percent of women were *not* fecund, meaning that they

Table 11. Number of Married Women 15-44 Years of Age (in thousands) and Percent Distribution by Fecundity Status, According to Age and Parity: United States, 1976 and 2002

Selected Characteristic	Year	Number of Women in Thousands	Fecund	Contraceptively Sterile	Noncontraceptively Sterile or Impaired Fecundity
Age					
All Ages	1976	27,488	56.1	18.6	25.3
	2002	28,327	50.1	32.7	17.2
15-29	1976	12,463	76.7	8.1	15.2
	2002	7,246	75.0	11.8	13.2
30-34	1976	5,736	47.5	26.5	26.1
	2002	6,351	58.0	25.2	16.8
35-39	1976	4,814	36.3	28.9	34.9
	2002	6,989	41.6	43.5	15.0
40-44	1976	4,474	31.2	26.4	42.4
	2002	7,740	28.1	48.8	23.2
Parity					
0	1976	5,235	73.0	1.5	25.5
	2002	5,142	65.6	6.8	27.6
1 or more	1976	21,983	52.1	22.6	25.3
	2002	23,185	46.7	38.5	14.8

Source: Mosher 1980; Chandra et al. 2005

were either sterile or suffered from impaired fecundity. By 2002, this figure had risen slightly to 49.9 percent. Yet this general trend includes women who were both contraceptively and noncontraceptively sterile. By subtracting out women who had undergone a sterilizing operation for the purposes of contraception, the trend is actually reversed: whereas 25.3 percent of women aged 15-44 in 1976 were considered either noncontraceptively sterile or to have impaired fecundity, 17.2 percent fell into this category in 2002, representing a decrease of 32 percent. The change in the direction of

this trend is accounted for by an overall increase in women who are sterile for purposes of contraception.

Interestingly, there is no consistent trend regarding changes in the percentage of fecund women by age. For the age groups 15 to 29 and 40 to 44, as well as the overall age range of 15 to 44, there has been a decline in the percentage of fecund women, with the greatest percent decline taking place overall at 10.7 percent, followed by a 9.9 percent decline in the percentage of fecund women between 1976 and 2002 for those aged 40 to 44. Meanwhile, for the age groups 30 to 34 and 35 to 39, there is an increase in the percentage of fecund women by 22.1 percent and 14.6 percent respectively. In other words, while a higher percentage of 30 to 39-year-olds qualify as “fecund,” a lower percentage of 15 to 29 and 40 to 44-year-olds, as well as women overall, do so.

Once again, these trends in overall fecundity can be misleading as, in several cases, they are dictated by significant changes in the percentage of women who are contraceptively sterile. Subsequently, it is worthwhile to also consider changes over time in the percentage of women who are either noncontraceptively sterile, or who have impaired fecundity. Interestingly, doing so reveals that the percentage of such women has actually declined for all age groups between 1976 and 2002. The largest decline is evident among 35 to 39-year-olds, who drop from 34.9 percent noncontraceptively sterile or of impaired fecundity in 1976 to 15.0 percent in 2002, representing a decrease of 57 percent. This decline is followed closely by that experienced among 40 to 44-year-olds, who drop from 42.4 percent noncontraceptively sterile or of impaired fecundity in 1976 to 23.2 in 2002, constituting a decrease of 45.3 percent.

This trend is really remarkable when examined alongside the overall decrease between 1976 and 2002 in fecundity among women aged 15 to 44 between 1976 and 2002. Ultimately, the factor responsible for what otherwise appear to be contradictory changes is, as mentioned above, an increase in the percentage of women contraceptively sterile in all age groups. Even if the population of women who have impaired fecundity or are noncontraceptively sterile is decreasing—suggesting, perhaps, medical advances and improvements in fertility treatment options—a greater number of women electing contraceptive sterilization is driving down the overall relative numbers of fecund women. In a context of fertility that is teetering on the edge of the replacement level, this may be an area worth exploring; for example, it would be informative to ascertain why more women are turning to sterilization.

In terms of fecundity status by parity, there was a slight increase in the population of women aged 15 to 44 with parity zero who were classified as having impaired fecundity or as being noncontraceptively sterile, from 25.5 percent in 1976 to 27.6 in 2002. However, the rate underwent a notable decrease for women with 1 or more children: 25.3 percent of these women in 1976 were noncontraceptively sterile or had impaired fecundity, while just 14.8 percent of women with 1 or more children in 2002 fell into this category; this is a decrease of about 41.5 percent. What the discrepancy in these two trends may well be illustrating is an improvement in diagnosis and fertility treatment options; that is, if a woman appeared subfecund, the doctors could determine more efficiently if she was actually sterile or simply struggling with impaired fertility—which could potentially be successfully addressed with medical advances.

Additionally, these improvements would likely assist women who already had one child, but were struggling to have a second, to achieve their fertility goals. Once again, due to increases in women engaging in sterilization procedures for contraceptive purposes, the overall level of fecundity at both a parity of 0 and 1 or more children has declined.

The next factor central to natural marital fertility is the duration of postpartum infecundability, which is inexorably tied to breastfeeding practices in the society. Breastfeeding habits in the United States are the product of an interesting legacy, which began with a late 19th-century push to encourage women to increase breastfeeding as a means of keeping their infants alive. Prior to reliable pasteurization methods and refrigeration, low rates of breastfeeding were tied to comparatively high rates of infant death due to issues with the cow's milk ingested by the babies (Wolf 2003). Even so, it was difficult for poor mothers to adhere to such recommendations when they often were forced to work long hours away from their young children. Efforts at disseminating knowledge about the benefits of breastfeeding were met with some success, but a more substantial effect resulted from the development of effective pasteurization techniques in the early decades of the twentieth century.

By the 1930s, many medical doctors were decreeing that human milk did not impart any particularly special advantages, and that "regular" milk was an adequate substitute. The product of this outlook was a rate of breastfeeding that reached an all-time low in 1971, with just 24 percent of mothers breastfeeding at least once before being discharged from the hospital. Since 1971, the rate of breastfeeding has "inexplicably receded and surged" as various movements and efforts, including the

women's movement of the 1970s, attempted to "rekindle" interest in breastfeeding (Wolf 2003: 2004). Nevertheless, the difference between the NSFG 1976 estimate of breastfeeding prevalence and the more recent measure from 2002 is substantial: while 38.2 percent of ever-married women 15 to 44 years of age reported breastfeeding at all in 1973, the overall rate of breastfeeding initiation increased to 67 percent in 2002 (Hirschman 1979; Chandra et al. 2005).

Despite this significant increase, breastfeeding initiation is not the only important factor; duration is also extremely important. According to the American Academy of Pediatrics, it is recommended that virtually all infants be breastfed for the first year of life, and exclusively so for the first six months (Chandra et al. 2005: 26). In 1973, only 13 percent of ever-married women aged 15 to 44 reported breastfeeding their first child for more than 3 months, without specific mention of whether the breastfeeding was exclusive, and with the percentage decreasing with subsequent births (Hirschman 1979). As of 2002, just 17 percent of women reported adhering to the recommendation of the American Academy of Pediatrics. According to Wolf (2003), this is a reflection of the current custom to supplement breast milk with formula early in an infant's life, discontinuing breastfeeding altogether after just a few weeks or months. Accordingly, 53 percent of mothers now introduce formula before their babies are a week old, 68 percent do so by 2 months, and 81 percent by 4 months of age, with less than 5 percent of American mothers claiming to be still breastfeeding their baby when the child becomes one year of age (Wolf 2003: 2005).

Even by 1973, the incidence of breastfeeding varied according to particular characteristics. Namely, the results of the NSFG Cycle I suggested that it was “most common among relatively advantaged women in society,” that is, women with college degrees and women working in high-status white-collar occupations. About half of such women reported having breast fed their first baby, with nearly a fifth doing so for three months or more (Hirschman 1979: 12). Interestingly, the same trend is still evident today: 2002 NSFG data reveal that college-educated mothers are far more likely to initiate breastfeeding, with 84 percent of college-educated mothers doing so compared to 50 percent of mothers with less than a high school education (Chandra et al. 2005: 27). Similarly, subgroups that have met or are most near to meeting the breastfeeding goals set by “Healthy People 2010” include Whites and Hispanics, mothers aged 30 to 44, those with college educations, and those with higher incomes (Chandra et al. 2005).

Despite medical evidence heralding breastfeeding as “preventative medicine at its best,” rates of exclusive breastfeeding—touted to be the best for both mother and child—and extended durations of breastfeeding, remain lower than what is considered ideal (Wolf 2003: 2006). Yet within the context of below-replacement fertility, it is important to consider the effects of successful efforts to promote breastfeeding. Taking the pregnancy-inhibiting consequence of exclusive breastfeeding into account, would not higher levels of breastfeeding result in even *lower* levels of fertility? After all, if breastfeeding becomes more widespread among the populations that typically have higher rates of fertility—such as the Hispanic population—isn’t it feasible that the fertility level could experience a noticeable decline? The answers to these questions are contingent upon a key factor:

contraception use. As Hirschman pointed out in the late 70s, “to the extent that breastfeeding previously provided some protection against unwanted and untimely pregnancy by its suppression of ovulation, that protection must now be foregone or provided by some other contraceptive means” (1979: 7). In other words, women who are not seeking to get pregnant are also women not relying on breastfeeding to operate as a contraceptive. Thus, any protection from pregnancy afforded by breastfeeding is nearly obsolete—assuming, of course, the proper employment of effective contraceptives.

Deliberate Marital Fertility Control

As with the case in South Korea, change in the level of marital fertility among U.S. women has been cited as a key factor influencing the decline in the TFR. Specifically, as noted above, 83 percent of the decline in the TFR between 1961 and 1975 has been attributed to decline in marital fertility (Gibson 1976: 252). The level of marital fertility is oftentimes inextricably tied to the employment of deliberate marital fertility control, a significant determinant of which is the underlying level of contraceptive usage. After all, if women only desire a small number of children, they “must spend approximately three decades of their reproductive lives trying to avoid an unintended pregnancy” (Becker et al. 2007: 206). Their ability to do so has undergone notable change over the past several decades. While many of the significant changes surrounding contraception usage in South Korea took place in relation to national family planning programs and efforts, the overwhelming majority of change in the United States has been related, instead, to developments in legislation.

The first birth control pill, known as Enovid, was approved by the FDA on May 9, 1960. Its release granted U.S. women “unprecedented freedom to plan childbearing and their careers” (Bailey 2006: 289). Nevertheless, this freedom was only available to some until *Griswold v. Connecticut* in 1965 had the effect of legalizing contraception (Shorto 2006). Indeed, the period of time during which these decisions were occurring was one of great social, legal, and economic change, including “the resurgence of the women’s movement, the spread of labor-saving household technologies, the enactment and increasing enforcement of antidiscrimination legislation, and the social unrest associated with the Civil Rights Movement and Vietnam” (Bailey 2006: 290). Within this context, the effects of legalized contraception—and the birth control pill in particular—had widespread effects: for example, the ability to delay childbearing allowed women to stay in school longer, pursue longer-term careers, and engage in labor force participation during ages more commonly associated with childrearing; meanwhile, among college women, oral contraception was tied to a later age at first marriage and greater representation in nontraditional and professional occupations (Bailey 2006: 317).

Bailey offers remarkable insights into the significance of the introduction of the birth control pill by highlighting three critical ways in which it “revolutionized the technology of birth control”:

First, the pill constituted the female contraceptive. A woman could independently decide to take the pill; it did not require the consent or knowledge of men or discomfort to either party during sex. The pill transferred control of contraception, which had long resided with men, to women who bore the high physical and opportunity costs of childbearing. Second, the pill divorced the decision to use contraception from the time of intercourse. This lowered the

marginal costs of preventing births during sex to zero and shifted decisions about contraception to times separate from the act of intimacy. Third, the pill's effectiveness far exceeded that of all other methods available in 1960. Whereas most couples regarded pregnancy risk as part of the costs of intercourse, oral contraception virtually eliminated concerns about unwanted conception (2006: 295-296).

Essentially, oral contraceptives gave women control over their reproductive choices and paths in a convenient and private manner.

Despite such benefits, not all segments of society were happy with the developments surrounding the release of the birth control pill. In 1968, an encyclical by Pope Paul VI served to establish an anti-contraception attitude among many Catholics. It “forbade ‘any action which either before, at the moment of or after sexual intercourse, is specifically intended to prevent procreation’” (Shorto 2006). Whereas Protestants and other non-Catholics were still able to partake in various forms of birth control under a “general society-wide acceptance,” this Catholic approach slowly ebbed into other spheres of Christianity. Typically, the use of contraception was associated with an “antichild mind-set” or as “worrisome in terms of respecting life” (Shorto 2006).

Despite religious opposition, another critical legal landmark was reached in 1976 when the Supreme Court determined in *Planned Parenthood of Central Missouri v. Danforth* that “the higher age of legal majority [was] inapplicable to the prescription of oral contraception” because states did not possess a “‘compelling interest’ in using age as the sole criterion under which to regulate contraceptive access” (Bailey 2006: 301). Ultimately, there were three main effects of opening the birth control pill to early access that revolved around reducing the costs of childbearing and increasing the returns to pursuing careers:

- (1) Reducing the cost of delaying pregnancy in order to make career investments, as young women could now stay in the labor market or educational institutions, invest in their careers, *and* be sexually active without the risk of pregnancy;
- (2) Increasing the expected lifetime returns to career investments by allowing women to control when and how often she would leave the labor force for purposes of childbearing; and
- (3) Increasing labor supply among women who may be willing to work to help their husbands gain more education or progress in their careers, without any real career aspirations of their own (Bailey 2006).

Such newfound opportunity, in conjunction with the women's rights movement, allowed women to determine what kind of family life and career paths they wanted, while granting them the tools to achieve these goals. Logically, by maximizing career opportunities and significantly minimizing unwanted pregnancies, the natural outcome would be a considerable depressing effect on total fertility. For these reasons, it is even more imperative that changes in women's contraceptive behaviors from the 1970s to the 2000s be considered.

As far as general contraceptive usage is concerned (see Table 12), the United States witnessed a slighter increase than South Korea between the 1970s and the 2000s among married women ages 15 to 49. Once again, it is important to note that the data from 1973 and 2002 are not *exactly* comparable: the sample in 1973 consisted of women strictly from the coterminous United States. Regardless, it is believed that the directions of the trends are correct, though the *extent* of the difference as measured by percent

**Table 12. Contraception Usage (in percentages) Among Currently Married Women
Ages 15-49, By Method: United States, 1973 and 2002**

Type of Contraception	1973	2002	% Change
Any method	69.6	72.9	4.7
Any modern method	48.2	68.5	42.1
Any traditional method	21.4	4.3	-79.9
Pill	25.1	17.2	-31.5
IUD	6.7	1.9	-71.6
Condom	9.4	12.0	27.7
Sterilization (male)	7.8	11.2	43.6
Sterilization (female)	8.6	21.7	152.3
Periodic abstinence	2.8	1.3	-53.6
Withdrawal	1.5	3.0	100.0

Note: % Change = (2002 value – 1973 value)/1973 value * 100

Sources: Ford 1979; Mosher et al. 2004

change may not be exact.

For the available data, the most notable development in overall trends between 1973 and 2002 is the decrease in usage of traditional methods: whereas 21.4 percent of percent of married women ages 15 to 49 relied upon traditional methods of contraception in 1973, this rate had decreased to 4.3 percent by 2002, representing a decline of about 80 percent. The causes of this dramatic change are certainly tied to the effective legalization of contraception that had taken place less than a decade prior in conjunction with the women’s movement, which would have encouraged women to employ more modern and effective methods of contraception—such as the birth control pill—in order to take their fertility into their own hands. Despite this significant decrease, the overall usage of contraception among married women as measured by those using “any method” increased only slightly, from 69.6 percent in 1973 to 72.9 percent in 2002. This suggests

that by 1973, acceptance of contraception was already fairly widespread, and that any alterations in contraceptive behavior had more to do with the development of new, more effective methods.

As was the case in South Korea, the most significant percent change in rate of usage took place specifically in the utilization of female sterilization. Usage of this method increased from 8.6 percent of married women ages 15 to 49 in 1973 to 21.7 percent in 2002—an increase of 152.3 percent—which makes it the most commonly used form of contraception by married women in both the United States and South Korea. Male sterilization also increased, though to a much slighter degree: whereas 7.8 percent of currently married women were relying on their husband's sterilization to prevent pregnancy in 1973, this rate had increased by 43.6 percent to 11.2 percent in 2002. To some, it may appear unusual that such a seemingly dramatic method of contraception as sterilization, which requires surgery and is effectively permanent, would find such popularity. However, Mosher and Bachrach address such qualms by offering this compelling explanation:

Why has sterilization, especially female sterilization, become so popular? First, the experience of an unintended pregnancy, whether it results in an unplanned birth or an abortion, is probably one reason why so many couples choose sterilization, with its minimal failure rate. Second, many women wish to avoid the side effects associated with reversible methods. (Such a concern may seem excessive, given the health data, but is nonetheless genuine.) Third, many couples have had all the children they want at a surprisingly young age and typically face 15 or more years in which they want to avoid any further pregnancies... While the initial cost of sterilization is higher than that of other methods, it is often covered by insurance. When averaged over many years, its long-term costs are relatively low. Thus, couples may view sterilization as providing permanent, coitus-independent protection from unwanted pregnancy at low cost and with no worry about side effects (1996: 6).

These reasons are especially convincing when it is considered that it is only among *married* women that sterilization is the most commonly employed method of contraception. Among all women in 2002, the birth control pill was the leading method of contraception with approximately 19% of women reporting current usage.

Meanwhile, female sterilization came in second among all women aged 15 to 44 at a current usage rate of 17 percent (Mosher et al. 2004). This is particularly interesting given that among married women, usage of the birth control pill actually underwent a 31.5 percent decline, from 25.1 percent of women in 1973 to 17.2 percent in 2002. This slight discrepancy between the behaviors of all women versus married women is certainly intriguing, but unfortunately it cannot be compared with the data from 1973 which were not collected for childless single women. Yet it seems likely that married women would have a higher propensity to become sterilized based on their membership in a supposedly committed and enduring relationship, which in theory allows them not only the freedom to have all the children that they want, but also to stop permanently without fear of recourse over potentially lost opportunities. Single women, on the other hand, are probably both less likely to already have children—let alone the total number that they desire—and are therefore less likely to find a technically irreversible surgical procedure an appealing prospect when a daily pill will do.

The second largest percentage increase was, interestingly, among women relying on withdrawal for contraception, which increased by 100 percent. However, it is important to note that the reason behind this significant percentage increase was the

originally very low rate: it increased from 1.5 percent to 3.0 percent, effectively doubling despite the very small increase in the number of women relying on this method.

In addition to these overall changes, there are also many noteworthy differences in contraception utilization by demographic characteristics. For example, it has been found that women of higher socioeconomic status are more likely to use contraception and less likely to experience contraceptive failure or unintended pregnancy than women of lower socioeconomic status (Frost, Singh, and Finer 2007). This is often due to differences in educational attainment, implying a greater knowledge of effective usage of modern methods of contraception, and higher incomes which enables women to more easily bear the sometimes costly expenses of contraception.

Another frequently identified area of discrepancy in terms of contraception usage is that of religion. There are three conditions on the part of a religious organization that have been cited as producing religious effects on fertility:

- (1) The dissemination of norms about specific fertility-related behaviors;
- (2) The ability to enforce conformity to these norms through either social influence or sanctions; and
- (3) The ability to foster a strong sense of religious solidarity, establishing religion as a central aspect of individuals' identities (McQuillan 2004).

As discussed above, closely following the legalization of contraception and the release of the birth control pill, the Catholic Church made its official anti-contraception stance known. One might expect that, as a result, Catholic women would easily have lower rates of usage than women of other religious backgrounds. This seems particularly

likely based on the mid-20th century trend of higher birthrates among Catholics as compared to Protestants; a trend which continued into the later 1960s, ultimately ending by the 1980s (Mosher and Bachrach 1996). As it turns out, married Catholic women in 1973 *were* less likely than Protestant women to be currently using contraception: while 66.4 percent of Catholic women reported using contraception, 70.6 percent of Protestant women were doing so. However, it is interesting to note that when we use 2002 data and compare all Roman Catholic women to U.S. women in general, being Catholic has very little effect on contraception usage. It was found that the Roman Catholic women had patterns of contraception usage that were very similar to those of U.S. women in general, but were slightly *more* likely to be currently using the birth control pill: 19.6 percent of Catholic women reported doing so, compared to 18.9 percent of U.S. women in general. However, Catholic women were slightly less likely to employ surgical sterilization either for themselves or their partners, with 17.5 percent of Catholics doing so compared to 19.2 percent of all U.S. women. Finally, in terms of condom usage, Catholic women and U.S. women had approximately equal rates of utilization (Ohlendorf and Fehring 2007). Unfortunately, it is difficult to draw conclusions from this general change in trends alone. Assuming that the Catholic Church has continued to disseminate its views on contraception to the same degree, it could mean, for instance, that they are either losing their ability to enforce conformity to their norms, or that Catholicism has lost some amount of salience with regards to individuals' identities. Without further research on the other characteristics of these women, it is impossible to say for sure. But sociological research by Andrew Greeley (1993) suggests both factors as significant. All that can be

said is that being Catholic does not appear to have the same depressing effect on contraceptive usage or, for that matter, on fertility that it once did.

In South Korea, a series of family planning programs at the national level have had serious implications for trends in fertility, especially with respect to deliberate marital fertility control. As already mentioned, legislation seems to have played a greater role in the contraceptive behaviors of women in the United States. Yet this is not meant to suggest that national family planning programs do not exist in the United States; they simply take a different form than those in South Korea, typically as non-government family planning organizations. Of these, perhaps the best known is Planned Parenthood. The Planned Parenthood Federation of America has worked for over 90 years to promote “a commonsense approach to women’s health and well-being, based on respect for each individual’s right to make informed, independent decisions about health, sex, and family planning” (Planned Parenthood n.d.). Indeed it was the Planned Parenthood Federation of America that, in 1959, funded a reproductive physiologist (Gregory Pincus) and a gynecology professor (John Rock) to develop a simple and effective oral contraceptive that was then marketed in 1960 as the first birth control pill (Poston and Bouvier 2010). To meet the above mandate, the Planned Parenthood Federation these days not only operates 850 health centers across the country, but is responsible for widespread media campaigns and massive efforts to achieve its goals on an international scale. Over the years, Planned Parenthood has been associated with the passage of virtually all legislation dealing with fertility and reproductive health. According to their website, each year:

- Over three million women, men, and teens are served in their affiliate health centers nationwide;
- Over 1.2 million teens and adults receive medically accurate sex education from their affiliates;
- Approximately one million women, men, and teens in other countries have their reproductive health needs met through their international programs;
- Over 15 million people around the world turn to their websites for Planned Parenthood services, information, and opportunities for involvement; and
- Over four million supporters, activists, and donors heed their call to take a stand on behalf of reproductive health and freedom (Planned Parenthood n.d.).

While the Planned Parenthood organization does not necessarily have the clout or legal authority of a government-mandated program of the South Korean type, their influence is undeniably effective and widespread.

Contraception is commonly utilized when pregnancy is perceived as an obstacle to the achievement of goals, or an otherwise undesired event. However, it is clear that in some cases, pregnancy occurs anyway. While some unplanned pregnancies result in live births, this is not always the outcome. The next section discusses one of the other possibilities: induced abortion.

Induced Abortion

Abortion became increasingly available during the same period of social

transformation in the 1960s and 1970s as described above by Bailey (2006).

Undoubtedly, young women's access to contraception and abortion had far-reaching effects on their lives. Yet abortion is arguably the most controversial form of deliberate marital fertility control in the United States. Entrenched in a religious and moral dispute over when "life" starts and at what point a human being's rights begin, the topic of abortion has been hotly debated for the past forty years. However, much earlier in the nation's history, abortions before a certain pregnancy duration were "both legal and commonplace, often performed by midwives" (Toobin 2009). During the nineteenth century, this began to change as medical professionals fought for control of health care and used the opposition of abortion as a means to achieve this goal. Subsequently, by 1868 thirty-six states had passed restrictive abortion laws, with the rest of the states to follow shortly thereafter (Krannich 1980). At the start of the following century, abortion was nearly universally illegal across the United States, with strict exceptions made for therapeutic abortions. By the mid-1960s, approximately 8,000 legal abortions were occurring annually, with a total of from 300,000 to 2,000,000 illegal abortions estimated to have taken place (Krannich 1980).

Though the feminist movement in the 1970s made monumental efforts to decriminalize abortion, resulting in the 1973 Supreme Court ruling in *Roe v. Wade* prohibiting states from outlawing it (Toobin 2009), a stigma has persisted around the procedure. Recently, so-called "conscience clauses" have evolved to essentially grant medical professionals in receipt of certain federal funds the right to refuse to perform abortions if in conflict with their personal religious beliefs or moral convictions (Toobin

2009). However, as Toobin states, abortion itself “is almost as old as childbirth. There has always been a need for some women to end their pregnancies” (2009).

Subsequently, it is interesting to examine how women’s use of abortion has varied over these past decades in order to assess the extent of its effect on total fertility.

Prior to the late 1960s, data on the rates, ratios, and distributions of abortion are limited and questionable at best. As Krannich states, “the most that can be said on the basis of available data is that abortion in the United States certainly did not decline with the implementation of laws and policies restricting legal access to induced pregnancy termination” (1980: 366). The liberalization of abortion laws has brought about marked improvements in data collection over the years. For example, the Centers for Disease Control and Prevention (CDC) began systematically compiling annual abortion data in 1969 in what they called an annual surveillance of legal abortions, which continues to be published to the present day. The Alan Guttmacher Institute began to collect data from abortion providers in 1973 to provide additional data (Krannich 1980). Despite this progress, there is still much concern about the underreporting of abortions that is tied to the stigmatized nature of the act. Jones and Kost identify a number of reasons why women may underreport induced abortion, such as the belief that abortion is immoral, guilt concerning the termination of the pregnancy, fear that they will be regarded with censure, or embarrassment stemming from the feeling that “the inability to prevent an unwanted pregnancy is socially blameworthy” (2007: 194).

Analyses of nationally representative samples of women in the United States, such as the NSFG, have estimated that anywhere from 35 to 59 percent of abortions that

occur are actually reported (Jones and Kost 2007). In particular, Black women, low-income women, unmarried women, and occasionally Hispanic women have been found to have higher rates of underreporting. This can cause a number of issues identified by Jones and Kost, including:

- (1) Inaccurate measurement of commonly used demographic measures, such as pregnancy rates, levels of unintended pregnancy, and contraceptive method failure rates;
- (2) Complications for research in which abortion is a key independent variable used to predict specific outcomes, such as depression, generalized anxiety disorder, or substance abuse; and
- (3) Inaccurate or misleading associations between abortion and other outcomes could be drawn (2007: 188).

Currently, some of these problems could be addressed by further research in the area of reliable predictors of underreporting, and the ability to compensate statistically for them. However, in the long run, it would be more valuable to target the stigma surrounding abortion, and to encourage women to open up about their experiences.

The CDC abortion surveillance system mentioned above consists of data tabulated annually from the fifty states, the District of Columbia, and New York City. It provides the total number of abortions by a wide variety of characteristics, as reported by the central health agency of each reporting area. A considerable limitation to this otherwise comprehensive system is the fact that the reporting of abortion data by the central health agencies is on a voluntary basis. As a result, the completeness of the

information obtained varies from year to year. In 2006, the year in which the following data were collected, 49 of the 52 reporting areas shared their information (CDC 2009). Because it is equally likely that the 1976 data—also based on the results of a CDC Abortion Surveillance—suffered from such limitations, it must once again be said that the trends described below are believed to be accurate, while the extent of the trends or differences over time may not be exact.

According to the CDC, 1,179,300 abortions were reported in 1976, as compared to 846,181 in 2006. This represents a decline of about 28.2 percent. This decline is particularly evident when change is analyzed according to age group (see Figure 6). It is easy to identify that the most dramatic changes took place among the 15 to 19 and 20 to 24-year-old groups; the decrease from nearly 363 thousand in 1976 to just over 121 thousand in 2006 among 15 to 19-year-olds represented a decline of about 66.6 percent, while the drop from approximately 392 thousand to 240 thousand among 20 to 24-year-olds was a nearly 39 percent decline. In reality, women under the age of 15 also experienced a significant percentage decline of over 75 percent during this time frame; however, because abortions among this age group are so relatively uncommon to begin with, the actual numeric change was only about 12 thousand fewer abortions, as compared to nearly 242 thousand among the 15 to 19-year-olds and about 152 thousand among the 20 to 24-year-olds.

Whereas the overall trend in the number of abortions is certainly negative, an intriguing difference may be found among the two oldest age groups: 35 to 39-year-olds and those aged 40 or over. In both cases, there was actually a slight *increase* in the total

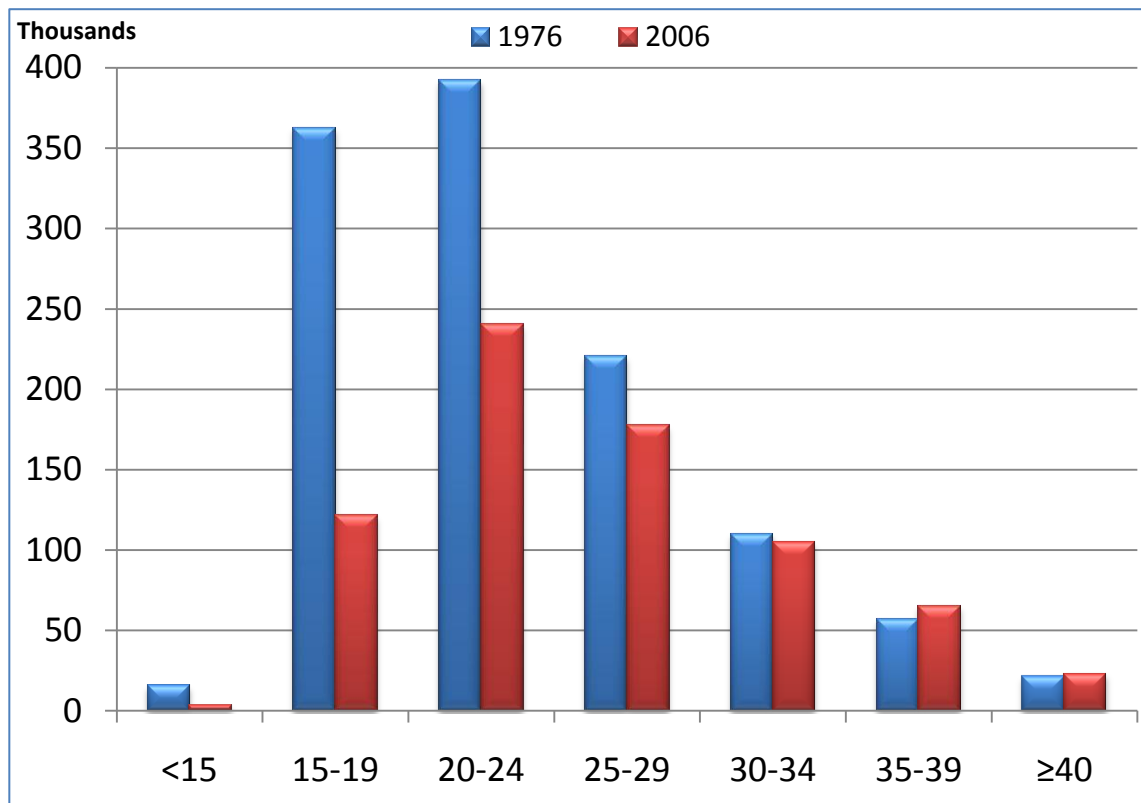


Figure 6. Number of Legal Abortions by Age Group: United States, 1976 and 2006

Sources: Forrest, Sullivan, and Tietze 1979; Centers for Disease Control and Prevention 2009

number of abortions between 1976 and 2006. This increase was most pronounced among the 35 to 39-year-olds, which is also more significant considering that the age group is not open ended (even though pregnancies, and thus abortions, above the age 49 are extremely rare). Among this group, the number of abortions increased from approximately 57 thousand to 65 thousand, or about 15 percent. From a purely speculative standpoint, it may be that the older a woman gets, the less she expects to get pregnant, and the more likely she is to either forgo contraception or experience a contraceptive failure, leading in some cases to ultimate termination of the pregnancy.

Even though these overall changes come across as fairly straightforward, what is not evident is the sharp increase in the number of abortions that took place following its legalization in 1973. According to the CDC, the rate of abortions peaked in the 1980s, and has since “declined at a slow but steady pace, but with considerable variation across demographic populations” (2009: 2). This variation is already evident by age, when considering that the number of abortions has actually increased slightly among the two oldest age cohorts. Further examples of this variation can be found in Table 13, which

Table 13. Number and Percentage Distribution of Legal Abortions by Selected Characteristics: United States, 1976 and 2006

Characteristic	1976	2006	1976 (%)	2006 (%)**
Total	1,179,300	846,181*	100.0	100.0
<i>Race</i>				
White	784,890	335,989	66.6	55.8
Non-White	394,410	266,348	33.4	44.2
<i>Marital Status</i>				
Married	290,030	103,214	24.6	16.5
Unmarried	889,270	534,603	75.4	83.5
<i>Previous live births</i>				
0	562,610	249,485	47.7	41.3
1	244,430	159,458	20.7	26.4
2	181,520	117,929	15.4	19.5
3	97,690	49,903	8.3	8.3
4 or more	93,050	25,938	7.9	4.4
<i>Previous Abortions</i>				
0	911,320	342,964	77.3	55.2
1	213,240	158,628	18.1	25.5
2	40,400	69,606	3.4	11.2
3 or more	14,340	48,325	1.2	8.0

*Some abortions were registered without data on particular characteristics. For this reason, the number of abortions in each category will not add up to the total number of abortions.

**Percentage of 2006 values represents percentage of *known* values for each characteristic.

Sources: Forrest, Sullivan, and Tietze 1979; Centers for Disease Control and Prevention 2009

presents the number and percentage distribution of legal abortions according to several different characteristics. Among the categories of race, marital status, and previous live births, the overall number of abortions declined for all groups. Yet when considered in terms of how the percentage of total abortions for each group has changed, it becomes apparent that there are differences by sub-category. For instance, though total abortions for both Whites and non-Whites decreased over the period of 1976 to 2006, the percentage of total abortions by race among Whites decreased by about 16 percent, while increasing among non-Whites by just over 32 percent. Similarly, among the married and unmarried, abortions overall declined, though the percentage of total abortions obtained decreased 33 percent for married women and increased almost 11 percent for unmarried women to 16.5 and 83.5 percent respectively. In other words, the vast majority of abortions are still obtained by the unmarried, and that percentage has increased since the 1970s.

With respect to previous experiences, the trend for previous live births follows the same pattern as that of race and marriage: despite the overall decline in the number of abortions, an increase in the percentage of total abortions took place among women with 1 or 2 births, while a percentage decrease took place among women with 4 or more previous births, or no births at all (women with 3 previous births experienced no change in their percentage). Despite these changes, the greatest percentage of abortions continues to take place among women with no previous births, with a smaller percentage taking place with each increase in parity. It is among trends in abortions based on the number of previous abortions that things are a little bit different: this is the only instance

in which, among two of the categories, there has been an overall increase: the number of abortions for women with 2 prior abortions increased from 40,400 in 1976 to 69,606 in 2006, representing an increase of 72.3 percent. At the same time, the number of abortions among women with 3 or more previous abortions increased by 237 percent from 14,340 to 48,325. In terms of the percentage of total abortions, women with no previous abortions declined in representation 28.6 percent from 77.3 percent of all abortions in 1976 to 55.2 percent in 2006. Each of the other three groups—one, two, and three or more previous abortions—experienced a resultant increase, to 25.5, 11.2, and 8.0 percent of total abortions, respectively. Thus, while the numbers of abortions by women in the latter two groups were unique in that they increased, they still constitute a combined total of just 18.2 percent of all abortions.

A final characteristic by which the level of abortions is often examined is the weeks of gestation at which the abortion takes place (see Figure 7). Socially, this is a very contentious issue because of the debate surrounding the experiences the fetus is believed to have at varying stages of fetal development. Regardless, it is clear that the vast majority of abortions in both 1976 and 2006 took place at 8 weeks' gestation or less: 47.4 percent in 1976 and 62 percent in 2006. What this means is that not only are women having fewer abortions than they did in 1976, but they are having them at earlier stages of the pregnancy. Figure 7 also makes it clear that among abortions in 2006, there is the sharpest decrease in percentage between a gestation time of 8 weeks or less and 9 to 10 weeks, after which there is a steady decline over the duration of pregnancy. Meanwhile, the decline since 1976 has been fairly steady from the 8 weeks or less

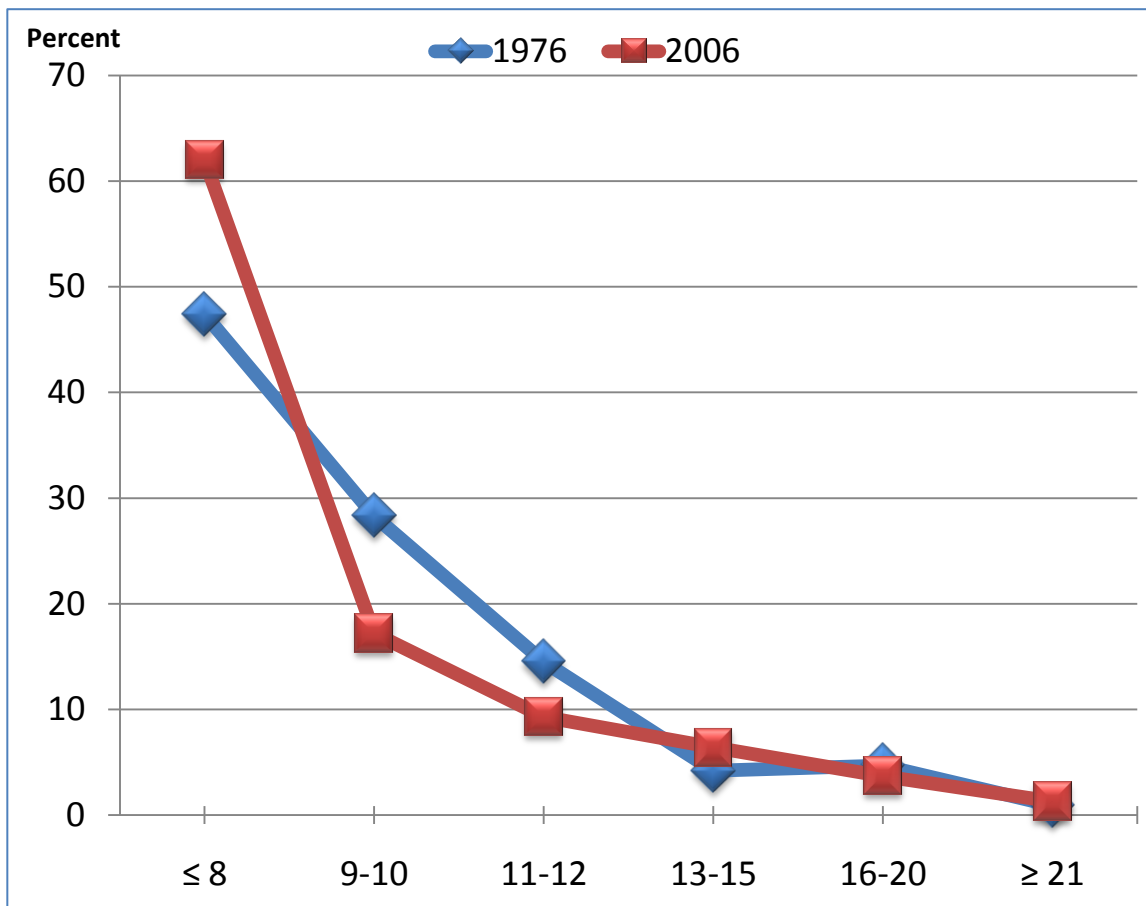


Figure 7. Percent Distribution of Legal Abortions by Weeks of Gestation: United States, 1976 and 2006

Sources: Forrest, Sullivan, and Tietze 1979; Centers for Disease Control and Prevention 2009

category through 13 to 15 weeks, at which there was a very slight increase (from 4.2 percent of all abortions to 4.7) before it declined again for gestations of 21 weeks or greater.

An interesting overall distinction between the use of abortion for deliberate fertility control in the United States as compared to South Korea is the way that abortions in the United States are essentially divorced from the issue of sex preference. As discussed in the previous chapter, many women in South Korea prefer sons, and

sometimes elect to have an abortion if they determine the fetus they are carrying is female. In the United States, no such overwhelming son preference exists, as demonstrated by the very stable sex ratios over the past decades (Poston 2005). In other words, U.S. women either have a balanced gender preference, or do not resort to techniques like sex-selective abortion to manipulate the sex of their children if a personal preference exists.

This chapter has examined how the proximate determinants have changed in the United States over time by taking an in-depth look at each determinant, one by one, at the sub-national level. In the next chapter, I will undertake a quantitative analysis of the impact over time of the four proximate determinants on the fertility levels of both South Korea and the United States.

CHAPTER VI

AN APPLICATION OF THE PROXIMATE DETERMINANTS MODEL TO TWO NATIONS OVER TIME

This chapter analyses the impacts of the four key proximate determinants on the fertility levels of both South Korea and the United States over time. I follow here the general style of Knodel and his associates (1987) in their study of fertility decline in Thailand. (See Chapter II for a more comprehensive description of this work, and Chapters IV and V for a consideration of the changing effects of the proximate determinants on the course of fertility over time in South Korea and the United States, respectively).

As demonstrated in the previous chapters, the proportion of women married, contraceptive use and effectiveness, the prevalence of induced abortion, and the duration of postpartum infecundability have all undergone varying degrees of change over the last several decades in both South Korea and the United States. It stands to reason that the influence of each on the total fertility rate (TFR) would have also varied over this period of time. To determine the extent of change in the relationship between each determinant and the TFR, the quantitative index for each may be calculated and substituted into Equation 1, first introduced in Chapter II:

$$\text{TFR} = C_m \times C_c \times C_a \times C_i \times \text{TF} \quad (1)$$

This calculation not only provides, as Bongaarts explained, “an approximate breakdown of the contributions made by [the] different intermediate variables to levels and trends in

fertility” (1982: 184), but it also makes possible the determination of the overall explanatory power of the four determinants in these two below-replacement fertility contexts; this is so because it facilitates a comparison within each of the two countries between the TFR estimated by this equation and the value of TFR calculated independently from the fertility data. Accordingly, following Bongaarts (1982), the quantitative indices were computed like so:

The Index of Marriage

The marriage index (C_m) represents the influence of membership in a marital or consensual union, and the resulting sexual exposure, on fertility. When it has a value of 1, it indicates that all women of reproductive ages are in such a union, while a value of 0 indicates that no women are in a marital or consensual union. The equation for this index is:

$$C_m = \Sigma m(a) g(a) / \Sigma g(a) \quad (2)$$

where

$m(a)$ = age-specific proportions currently married (or in consensual union)

among females; and

$g(a)$ = age-specific marital fertility rates.

Thus, to calculate it necessitated identifying both the proportions married by age as well as age-specific marital fertility rates. Because the latter is not always available, Bongaarts and Potter (1983) advise that age-specific marital fertility rates can be obtained instead by dividing the age-specific fertility rate by the proportion of women currently married in each age group. The only caveat for employing this approach arises

for the 15 to 19 cohort, whose results can be “erratic” because of small errors in the proportion married that translate into large errors in the age-specific marital fertility rate. Additionally, Bongaarts and Potter point out that the majority of married women in this age group are actually the 18 and 19-year-olds, and are therefore not representative of the entire age group. To address this issue, they offer a special equation that calculates the age-specific marital fertility rate for the 15 to 19-year-olds based on the value of the 20 to 24-year-old population:

$$g(15-19) = 0.75 \times g(20-24) \quad (6)$$

It is important to note, however, that this equation is applied only to the denominator of Equation 2 in order to ensure the validity of the calculation of the TFR in Equation 1.

Table 14 presents the input data used to calculate the index. Using the adjustment

Table 14. Input Data for Calculation of Index of Marriage: South Korea, 2008, and the United States, 2005

Age Group	South Korea		United States	
	m(a)	g(a)	m(a)	g(a)
15-19	0.007	1.7	0.018	41.9
20-24	0.107	18.2	0.219	105.9
25-29	0.592	85.6	0.497	116.8
30-34	0.869	101.6	0.635	97.7
35-39	0.907	26.5	0.666	47.3
40-44	0.889	3.2	0.673	9.4
45-49	0.861	0.2	0.664	0.6*

*Rate for age group 45-54; because of the low incidence of births above age 49, it is not believed that this discrepancy affects the overall calculation of the index of marriage.

g(a) = age-specific fertility rate

m(a) = age-specific proportion currently married or in consensual union

Source: United Nations Population Division 2007b; Hamilton et al. 2007; Statistics Korea 2009a, 2009b

provided by Equation 6 reduces the contribution of the 15-19 group in the numerator from 0.095 to 0.012 for South Korea, and from 1.430 to 0.754 for the United States. The resulting index of marriage is 0.713 for South Korea and 0.480 for the United States.

The Index of Contraception

The contraception index (C_c) represents the influence of deliberate fertility control through the use of contraceptives on the level of fertility. When it has a value of 1, it indicates that no contraception is being used, while a value of 0 indicates that all fecund women of reproductive ages are using completely effective modern methods of contraception. As explained by Bongaarts and Potter, this index “varies inversely with prevalence and use effectiveness of contraception practiced by couples” (1983: 82).

Therefore, the equation for this index is:

$$C_c = 1 - 1.08 * u * e \quad (3)$$

where

u = proportion currently using contraception among married women of reproductive age (male methods, abstinence other than postpartum, and sterilizing operations are included); and

e = average use-effectiveness of contraception; the weighted average of the method specific use-effectiveness levels $e(m)$ with the weights equal to the proportion of women using a given method, $u(m)$: $e = \sum e(m) u(m)/u$.

The 2008 *Family Planning Worldwide Data Sheet* provided the individual measures of the percentage of married women using various methods of contraception. These

became the measures of u in Equation (3). Ultimately, I used as many types of contraception in the equation as I had values for both u and use effectiveness for a given country. However, to calculate the e component of the equation, the average use-effectiveness of each form of contraception, I adapted measures of failure rates from Trussell (2004 and 2007) into success rates by subtracting these values from 100, and then dividing by 100 to turn them into a rate. I opted to use the “use effectiveness” instead of the “theoretical effectiveness” failure rates because they provide more valid measurements of reality. “Use effectiveness” refers to how well contraception works in actual practice; “theoretical effectiveness” refers instead to what is known in the epidemiology literature as *efficacy*, or how well a contraceptive method works in clinical trials (Trussell 2004), i.e., theoretically. For cases in which Trussell provided more than one measure for a type of contraceptive—for instance, giving the failure rate for both ParaGard and Mirena (each a type of intrauterine device)—I took the average if the values were not identical. In these cases, the difference was often a matter of but a few hundredths of a point. For the contraceptive practice “periodic abstinence,” also known as the “calendar method” or the “rhythm method,” only a theoretical use effectiveness rate was available. Subsequently, the use effectiveness rate for all fertility awareness methods, which also includes the “ovulation method” and “standard days” was deemed a suitable substitute and used as opposed to dropping the measure entirely. These values are shown in the table in Appendix 1.

The measures available for South Korea and the United States are shown in Table 15. The United States had data for all categories: the pill, intrauterine device,

Table 15. Input Data for Calculation of Index of Contraception: South Korea, 2008, and the United States, 2002

Type of Contraception	Contraceptive Prevalence		Use Effectiveness
	South Korea	United States	
Any method (u)	0.805	0.729	--
Any modern method	0.669	0.685	--
Any traditional method	0.136	0.043	0.74
Condom	0.151	0.120	0.85
Injection	n/a	0.022	0.97
IUD	0.132	0.019	0.9955
Periodic Abstinence	n/a	0.013	0.75
Pill	0.018	0.172	0.92
Sterilization (female)	0.241	0.217	0.995
Sterilization (male)	0.127	0.112	0.9985
Withdrawal	n/a	0.030	0.73

n/a = data not available

Sources: Clifton, Kaneda, and Ashford 2008; Mosher et al. 2004; Trussell 2004 and 2007

injection, male condom, female sterilization, male sterilization, periodic abstinence, and withdrawal. However, South Korea lacked data on injection usage, as well as the traditional methods of periodic abstinence and withdrawal. Because, instead, there was a usage rate available for the blanket measure of “traditional methods,” I substituted the average of use effectiveness for the two primary traditional methods: withdrawal and the calendar method. This produced an estimated use effectiveness of 0.74 for “traditional methods.”

Then, because e is actually the *weighted* average of the method specific use-effectiveness levels with the weights equal to the proportion of women using a given method, e was calculated individually for each of the two countries using the formula $e = \sum e(m) u(m) / u$. The resultant value was 0.92 for South Korea and 0.94 for the United States. Finally, substituting these values into Equation 3 produced an index of

contraception for the 2000s of 0.197 in South Korea and 0.263 in the United States.

The Index of Induced Abortion

The induced abortion index (C_a) represents the influence of deliberate fertility control through the use of abortion on the level of fertility. When it has a value of 1, it indicates that no induced abortion is practiced in the population, while a value of 0 indicates that every pregnancy that occurs is aborted. According to Bongaarts and Potter, “the number of births averted per induced abortion is strongly related to the practice of contraception following the induced abortion. In the absence of contraception, an induced abortion averts about 0.4 births, while about 0.8 births are averted when moderately effective contraception is practiced” (1983: 85). This relationship is represented by the equation $b = 0.4 (1 + u)$, where u is equal to the prevalence of contraception among all married women, also used in the previous calculation for the index of contraception. The value of b is then substituted into the equation for the index of induced abortion as follows

$$C_a = \frac{\text{TFR}}{\text{TFR} + b * \text{TA}} = \frac{\text{TFR}}{\text{TFR} + .4 * (1 + u) * \text{TA}} \quad (4)$$

where

TA = total abortion rate, the number of induced abortions per woman at the end of the reproductive period if induced abortion rates remain at prevailing levels throughout the reproductive period (excluding induced abortions to women who are not married).

Table 16. Input Data for Calculation of Index of Induced Abortion: South Korea, 1999, and the United States, 2006

Age Group	Age-Specific Abortion Rates	
	South Korea	United States
15-19	n/a	0.3
20-24	53	6.6
25-29	33	11.2
30-34	33	8.8
35-39	12	5.3
≥40	1	1.7
Total Abortion Rate	0.66	0.17

n/a = data not available

Total abortion rate = (sum of age-specific abortion rates * 5)/1000

Sources: Cho 2002 (South Korea only); U.S. rates adapted from Centers for Disease Control and Prevention 2009

The calculation of the total abortion rate, in turn, necessitates measures of the rate of abortion by age (see Table 16). Because abortion rates by age in the United States were only available for *all* women, these numbers were standardized by the proportion of women married in each age group, resulting in the age-specific abortion rates above. Inserting these rates into Equation 4 produces an index of induced abortion of 0.711 for South Korea and 0.946 for the United States.

The Index of Postpartum Infecundability

The postpartum infecundability index (C_i) represents the influence of lactation and breastfeeding behaviors following birth on the level of fertility. When it has a value of 1, it indicates that no women are experiencing postpartum infecundability—that is, there is an absence of lactation—while a value of 0 indicates that all women are

experiencing postpartum infecundability—that is, the duration of this period is infinite. Essentially, this index is equal to “the ratio of the [total natural marital fertility rates] in the presence and absence of postpartum infecundability caused by breastfeeding or abstinence” (Bongaarts and Potter 1983: 86). In order to establish the value of this index for a population, it is first necessary to determine the length of the birth interval if no breastfeeding or postpartum abstinence are practiced. According to Bongaarts and Potter, this duration is equal to about 20 months, which consists of “the sum of 1.5 months of minimum postpartum anovulation, 7.5 months of waiting time to conception, 2 months of time added by spontaneous intrauterine mortality, and 9 months for a full-term pregnancy” (1983: 86). Adding in the presence of breastfeeding and postpartum abstinence shortens this duration, resulting in a value of 18.5 months. Subsequently, the equation for this index becomes:

$$C_i = \frac{20}{18.5 + i} \quad (5)$$

where

i = average duration of postpartum infecundability caused by breastfeeding or postpartum abstinence.

Because data on the average duration of postpartum infecundability for most populations are not available, approximate values are estimated based on the average duration of breastfeeding according to an equation supplied by Bongaarts and Potter (1983):

$$A = 1.753 e^{0.1396 * B - 0.001872 * B_2} \quad (7)$$

where

i = average duration of postpartum infecundability caused by breastfeeding or postpartum abstinence.

The results of this calculation for South Korea and the United States are presented in Table 17. An average 3.0 months of breastfeeding among women in South Korea translates to approximately 2.62 months of postpartum infecundability; that is, each additional month of breastfeeding results in less than one additional month of postpartum amenorrhea (Bongaarts and Potter 1983). Similarly, an average of 5.5 months of breastfeeding among women in the United States translates to approximately 3.57 months of postpartum infecundability. Substituting these values into Equation 5 produces a postpartum infecundability index of 0.947 for South Korea and 0.906 for the United States.

The Proximate Determinants Model in Low Fertility Countries

The quantitative indices developed above for the four primary determinants each range from 0 to 1, where 0 represents complete fertility inhibition and 1 represents no

Table 17. Input Data for Calculation of Index of Postpartum Infecundability: South Korea, 2003, and the United States, 2006

Country	Average Months of Breastfeeding	Average Months of Postpartum Infecundability (i)
South Korea	3.0	2.62
United States	5.5	3.57

Sources for Average Months of Breastfeeding: Chung, Kim, and Nam 2007; Briefel et al. 2004

fertility-inhibiting effect of a given intermediate variable. Accordingly, it is possible to see how the higher the value for the four determinants overall, the higher the corresponding fertility. However, because the level of fertility in a population is the result of the combination of all four determinants, the effect of one may overwhelm the effect of another. Table 18 presents the values of the following four fertility levels and other selected measures calculated with the four indices.

Based on the results for the model indices, it is apparent that considerable changes have taken place among the proximate determinants of both South Korea and the United States over the period of the late 1960s/early 1970s and the 2000s. Upon first glance, there is a notable difference between the observed TFRs and the estimated TFRs for the 2000s data that appears more extreme than that resulting from Bongaarts' own estimations. Whereas Bongaarts' estimated TFR for South Korea in 1970 was just 4 percent lower than the observed TFR, my estimated TFR for South Korea in the 2000s of 1.45 was 24 percent higher than the observed TFR, 1.17. Similarly, Bongaarts' estimated TFR for the United States in 1967 was only 3 percent lower than the observed TFR for that same year, while my estimated TFR for the 2000s of 1.66 was about 20 percent lower than the observed TFR of 2.07. In consideration of these differences, it seems reasonable to conclude that the proximate determinants model does not do as well in predicting the total fertility rate of South Korea and the United States in the 2000s as it did back in the late 1960s and early 1970s.

Examining the changes to each determinant individually offers greater insight into the overall difference in fertility over this period of time. In South Korea, the

Table 18. Estimates of Selected Reproductive Measures and Derived Indices of Four Proximate Determinants According to Bongaarts' Model Over Time: South Korea and the United States

Measure	South Korea		United States	
	1970	2000s	1967	2000s
Observed Total Fertility Rate (TFR)	3.97	1.17	2.34	2.07
Total marital fertility rate (TMFR)	6.85	2.03	3.71	3.45
Current contraceptive use (u)	0.24	0.805	0.72	0.729
Total induced abortion rate (TA)	1.5	0.66	1.080	0.17
Lactational infecundability (i)	11.90	2.62	3.0^	3.57
Model Indices				
Index of marriage $C_m = \text{TMFR}/\text{TFR}$	0.580	0.714	0.631	0.481
Index of contraception $C_c = (1 - 1.08 * u * e)$	0.769	0.197	0.254	0.263
Index of induced abortion $C_a = \text{TFR}/\{\text{TFR} + [.4 * (1 + u) * \text{TA}]\}$	0.820	0.711	0.999	0.946
Index of lactational infecundability $C_i = 20/(18.5 + i)$	0.658	0.947	0.930^	0.906
Combined Indices $C_m * C_c * C_a * C_i$	0.241	0.095	0.149	0.108
Model Estimate of TFR $C_m * C_c * C_a * C_i * \text{TF}$	3.81	1.45	2.27	1.66

^According to Bongaarts and Potter, figure is approximate.

Note: Total induced abortion rate for South Korea actually based on data from 1999, which was the most recent age-specific abortion data available.

e = average use-effectiveness of contraception, the weighted average of the method specific use-effectiveness levels $e(m)$ with the weights equal to the proportion of women using a given method, $u(m)$:
 $e = \sum e(m) u(m)/u$.

TF = The *Total Fecundity Rate*, or the fertility level that occurs when the combined effect of the remaining intermediate variables is removed, namely fecundability, spontaneous intrauterine mortality, and permanent sterility. Bongaarts estimated this value to be about 15.3 for all women.

Sources: 1970 and 1967 data from Bongaarts and Potter 1983

greatest change in percentage points occurred for the index of contraception, revealing that the inhibition due to contraceptive prevalence and effectiveness increased from 23 percent to 80 percent. A second dramatic change, though less so, occurred with the

index of postpartum infecundability, which decreased nearly 30 percentage points from 34 percent in 1970 to 5 percent in the 2000s. The change in the index of proportion married or in consensual unions was less pronounced, with its inhibiting effect decreasing about 13 percentage points from 42 percent to 29 percent. Finally, the inhibition due to induced abortion increased about 11 percentage points from 18 percent to 29 percent. Based on the direction of these changes, it appears that the rate of contraception usage and the prevalence of induced abortion were primarily responsible for the decrease in the TFR over this time period. However, these changes—particularly for the index of marriage—are quite surprising when considered that they occurred counter to the trends witnessed over this period of time. That is, South Korean women were observed to get married later and in slightly smaller proportions in the 2000s than they did in the 1970s; thus it would seem to hold that the inhibiting effect of marriage would have *increased* over this time. Possible explanations for this contradictory result will be explored in the “Discussion” section of Chapter VII.

Ultimately, these changes resulted to a differing order of magnitude regarding the extent that each determinant inhibits fertility. In 1970, the proportion married had the strongest inhibiting effect, followed by the average duration of postpartum infecundability, contraceptive usage and effectiveness, and induced abortion. By the 2000s, contraceptive usage and effectiveness had become the strongest inhibitor, followed by induced abortion, the proportion married, and the average duration of postpartum infecundability.

In the United States, change in the inhibiting effects of the individual determinants was less pronounced across the board. The greatest change in percentage points occurred for the index of marriage, revealing that the inhibition due to the proportion married or in consensual unions increased 15 percentage points from 37 percent to 52 percent. The second largest change took place for the index of induced abortion, with the inhibiting effect increasing about 5 percentage points from 0.1 percent to 5 percent. Meanwhile, the inhibiting effects of both postpartum infecundability and contraceptive prevalence and effectiveness remained virtually unchanged, with the inhibiting effect of postpartum infecundability increasing about 2 percentage points from 7 percent in 1967 to 9 percent in the 2000s, and the effect of contraception decreasing very slightly from 75 percent to 74 percent.

As with South Korea, not all of the trends follow the direction of change suggested by the case study. In particular, the inhibiting effect of contraceptive usage decreased slightly, even though the usage rate, particularly among modern methods, by American women increased between 1960 and the 2000s. This trend will also be explored in greater detail in the “Discussion” section of the following chapter. However, unlike the case of South Korea, the changes observed over time did not contribute to a different order of magnitude in the extent that each determinant inhibits fertility. In both 1967 and the 2000s, contraceptive use and effectiveness had the strongest inhibiting effect, followed by the proportion married or in consensual unions, the average duration of postpartum infecundability, and the prevalence of induced abortion.

Another way to interpret the change over time in the proximate determinants is by assessing the proportion of change in the total fertility rate that is due to changes in each determinant. This may well be the most interesting analysis of my dissertation. Figure 8 illustrates this concept by representing the proportion change in the determinants between the late 1960s/early 1970s and the 2000s, as well as the overall proportion change in the TFR over that period. It is useful for seeing both the direction and extent of the proportion change for each proximate determinant. For South Korea, the TFR underwent a decrease of 62 percent. However, on an individual basis, the

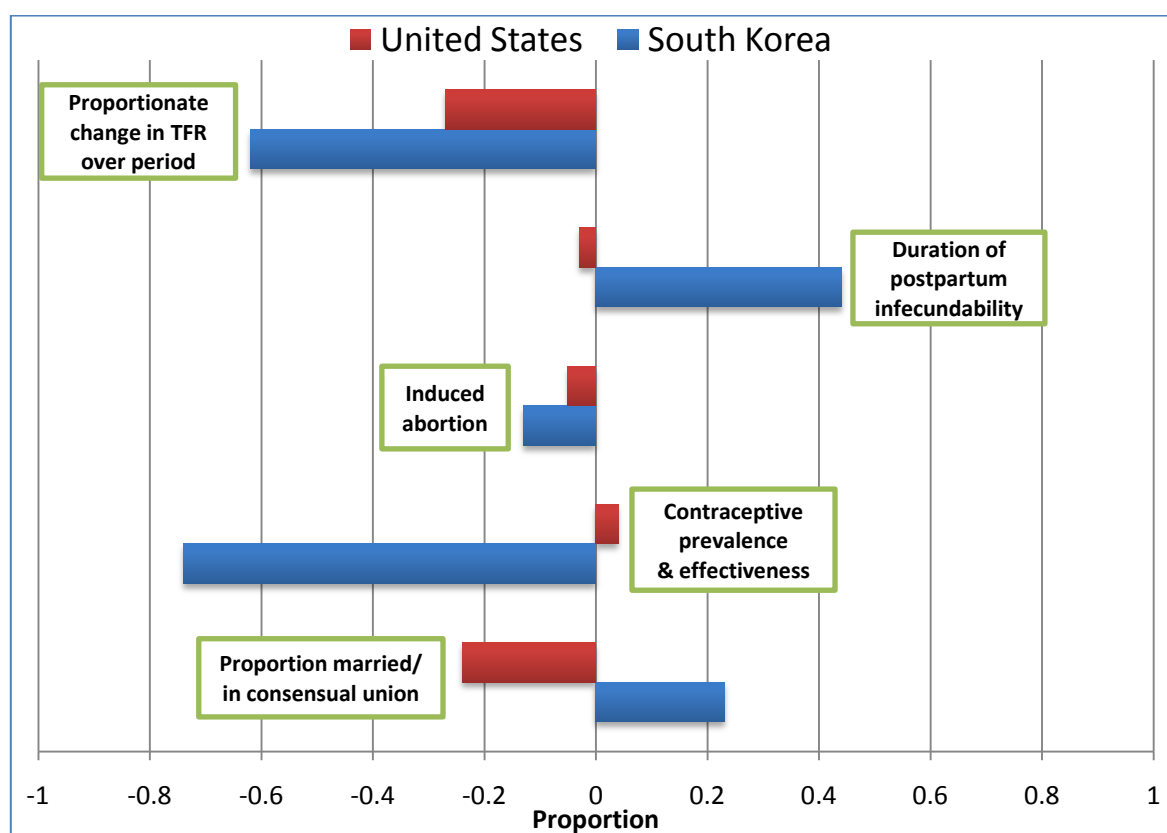


Figure 8. Proportion of Change in Total Fertility Rate Due to Changes in the Proximate Determinants of Fertility: South Korea, 1970-2000s and the United States, 1967-2000s

change to the index of contraception was greater, decreasing almost 75 percent. Change to the index of postpartum infecundability was second greatest, though in the opposite direction, increasing by about 44 percent. Meanwhile, the indices of marriage and induced abortion underwent slighter changes over time, with the index of marriage increasing by 23 percent and the index of induced abortion decreasing by 13 percent.

It is interesting to note that because among the four determinants, two experienced increases while the other two experienced decreases over this same period of time, the already significant overall change in the TFR was not as extreme as it otherwise would have been. That is, the inhibiting effects on fertility of the proportion married and the duration of postpartum infecundability decreased, while the inhibiting effects of contraception and abortion increased. It was changes to contraceptive prevalence and effectiveness and the utilization of induced abortion that resulted in the overall TFR declining so precipitously. Yet if the inhibiting effect of marriage had *increased*—indicating that fewer women were entering into consensual unions and thus exposing themselves to the risk of pregnancy (which, as discussed briefly above, is actually what happened)—than the TFR might be even lower than it is. Similarly, if a greater number of women had decided to breastfeed their infants, then the duration of postpartum infecundability would have been extended, and the inhibiting effect of this determinant would have been increased. The overall effect would be an even lower TFR than South Korea currently possesses, which is one of the very lowest in the world. Had the above actually occurred, it is likely that South Korea's TFR today would be less than 1.0.

On the other hand, had fewer women employed effective methods of contraception or elected to have an induced abortion, the inhibiting effects of these indices would have *decreased*, either slowing down the overall decline in the TFR or even resulting in an increased fertility rate. Examining the potential effects of these changes on the fertility rate of the population has very intriguing implications, which will be explored in the next chapter.

For the United States, the percent change in the TFR between 1967 and the 2000s was much less substantial than that experienced by South Korea, decreasing just 27 percent. And unlike the situation in South Korea, the majority of the effects of the changes in the proximate determinants worked mainly in the same direction, with the indices of marriage, induced abortion, and postpartum infecundability decreasing by 24 percent, 5 percent, and 3 percent respectively, representing an increase in the inhibiting effect of all three. The index of contraception increased slightly by 4 percent. Because three of the four indices changed in the same direction—increasing their inhibiting effect on fertility—it is unlikely that a change to the direction any individual determinant would have had a significant effect on the overall fertility level. However, if one determinant were to have such an effect, it would most likely be the index of marriage. In other words, if women had continued to marry at their 1967 rate, or if a higher proportion of women had either married or stayed married (i.e. fewer divorces), then the index of marriage would have remained higher, while the inhibiting effect of marriage would have been less than it was reported to be for the period around 2000. Overall, this

would have slowed down the already-gradual decline in U.S. fertility between 1967 and the 2000s.

Testing the Hypotheses

In Chapter III, a number of hypotheses were proposed according to expected relationships between the proximate determinants of fertility and the total fertility rates in South Korea and the United States. It is now possible to take the results presented in this chapter and determine whether or not the hypotheses were supported:

Generally speaking, I hypothesized that the proximate determinants model of fertility would not explain over 90 percent of the variation in the total fertility rates of two below-replacement nations, as it did when applied to a combination of primarily developing nations and historical populations in Bongaarts' original study. While there was no method available to identify the specific proportion of variance explained for each country, the differences between the estimated and observed TFRs from my analyses were much more significant than the differences produced in Bongaarts' study. Furthermore, the presence of contradictory or inconsistent results between the case studies and the quantitative analysis shown above suggest that the proximate determinants did not perform as robustly in a low-fertility application as they did in Bongaarts' original analysis, leading me to believe that this hypothesis was supported by the data.

Additionally, I identified a series of specific hypotheses:

1. *The effect of the marriage determinant among Korea women and U.S. women will be weaker in the 2000s than it was in the 1970s.* If the index of marriage continued to be a strong determinant of fertility, we would expect to see continuity between the trends identified in the case studies and the calculated indices. Though this held true for the United States, the opposite was found for South Korea, where trends suggesting declines in marriage were identified in the case study, but the determinant reflected a greater contribution of the proportion married to the total fertility rate. This suggests that the relationship between the determinant and the fertility level has weakened, providing support for this hypothesis.
2. *The effect of the contraception determinant among Korea women and U.S. women will be weaker in the 2000s than it was in the 1970s.* If the index of contraception continued to be a strong determinant of fertility, we would again expect to see continuity between the trends identified in the case studies and the calculated indices. Generally speaking, I found continuity. In South Korea, where the usage rate increased substantially between the 1970s and the 2000s, the inhibiting effect of contraception increased significantly. Meanwhile, in the United States, where the usage rate increased only slightly, the inhibiting effect of contraception remained virtually the same. This suggests that the relationship between the contraception determinant and fertility has not weakened, and that this hypothesis was not supported.

3. *The effect of the postpartum infecundability determinant among Korea women and U.S. women will not be significantly different in the 2000s than it was in the 1970s.* To determine that the effect of the index of postpartum infecundability has not changed significantly between the 1970s and the 2000s would require the demonstration of fairly constant trends identified in the case studies as well as minimal change between the indices. While this might be the case for the United States, where the overall balance of changes in breastfeeding initiation and average duration did not appear to have made a substantial difference in the period of postpartum amenorrhea, the same cannot be said among Korean women. In South Korea, there has been a sharp decline in the proportion of women who report breastfeeding their infants since the 1970s; this change is reflected in the index of postpartum infecundability, which increased significantly, hence indicating a less pronounced inhibiting effect of breastfeeding on the fertility level. In other words, while the effect of this determinant may not be as strong as the others, its impact on fertility has certainly changed since the 1970s. Therefore, this hypothesis is not supported.
4. *The effect of the induced abortion determinant among Korea women and U.S. women will not be significantly different in the 2000s than it was in the 1970s.* Once again, the determination that the effect of the index of induced abortion has not changed significantly between the 1970s and the 2000s would require fairly constant trends identified in the case studies as well as

minimal change between the indices. In both South Korea and the United States, a general decline indeed took place in the number of abortions, decreasing the inhibiting effect of induced abortions on the fertility level. Yet this effect was not reflected in the index of induced abortion for either country: for both, the index decreased suggesting a greater inhibiting effect, and quite substantially so in South Korea. Ultimately, it seems there have been changes in the effect of the index of induced abortion on fertility, and that induced abortion may not be as effective a determinant as it once was. This hypothesis has not been supported.

5. *Change in the index of marriage will contribute significantly to change in the fertility rate of South Korean women between the 1970s and the 2000s.*

Relative to the other indices for South Korea, the index of marriage did not undergo significant change between the 1970s and 2000s. Thus, this hypothesis has not been supported.

6. *Change in the index of contraception will contribute significantly to change in the fertility rate of South Korea women between the 1970s and the 2000s.*

Relative to the other indices for South Korea, the index of contraception underwent very significant change between the 1970s and 2000s. Thus, this hypothesis has been supported.

7. *Change in the index of abortion will not contribute significantly to change in the fertility rate of South Korea women between the 1970s and the 2000s.*

Relative to the other indices for South Korea, the index of induced abortion underwent the least amount of change between the 1970s and 2000s.

Therefore, this hypothesis has been supported.

8. *Change in the index of postpartum infecundability will not contribute significantly to change in the fertility rate of South Korea women between the 1970s and the 2000s.* Relative to the other indices for South Korea, the index of induced abortion experienced a significant amount of change between the 1970s and 2000s. Therefore, this hypothesis has not been supported.

9. *Change in the index of marriage will contribute significantly to change in the fertility rate of women in the United States between the 1970s and the 2000s.*

Relative to the other indices for the United States, the index of marriage underwent the greatest amount of change between the 1970s and 2000s.

Therefore, this hypothesis has indeed been supported.

10. *Change in the index of contraception will contribute significantly to change in the fertility rate of U. S. women between the 1970s and the 2000s.*

Relative to the other indices for the United States, the index of contraception underwent a minimal amount of change between the 1970s and 2000s.

Consequently, this hypothesis has not been supported.

11. *Change in the index of abortion will contribute significantly to change in the fertility rate of women in the United States between the 1970s and the 2000s.*

Relative to the other indices for the United States, the index of induced

abortion underwent a minimal amount of change between the 1970s and 2000s. Therefore, this hypothesis has not been supported.

12. *Change in the index of postpartum infecundability will not contribute significantly to change in the fertility rate of women in the United States between the 1970s and the 2000s.* Relative to the other indices for the United States, the index of postpartum infecundability experienced the smallest degree of change between the 1970s and 2000s. As a result, this hypothesis has been supported.

The final chapter of my dissertation will discuss the results of these hypotheses tests in greater detail, and will especially consider the implications for the proximate determinants model in a low fertility context. It will also examine directions for future research.

CHAPTER VII

DISCUSSION AND CONCLUSION

In this final chapter of my dissertation, I review and evaluate the basic findings presented in earlier chapters. As I have noted previously, the hypotheses proposed and tested received mixed levels of support. Whereas five of the twelve specific hypotheses dealing with the specific proximate determinants received some support from the case studies and quantitative model, seven did not. However, it still may be said that my research provides evidence that the proximate determinants of fertility paradigm may be in need of respecification for the purposes of application in below-replacement fertility nations. This chapter illustrates the why and the how of this conclusion by examining the findings in detail. Then, the implications of these findings will be considered with regard to future research, theories, and policies relating to below-replacement fertility.

Perhaps the most notable findings of my dissertation arise from the inconsistencies uncovered between the trends identified in the case studies and the results of the quantitative analysis of change to the determinants over time. Theoretically speaking, if a case study reveals a trend in one direction—e.g. an increase in contraception usage—then the quantitative index representing that determinant should reflect the same change. In cases where this was not the case, it suggests that the proximate determinants model may not be as effective a model with respect to the conceptualization and measurement of that particular aspect of fertility as it once was. Table 19 summarizes the results of both the case studies and quantitative analysis,

Table 19. Review and Summary of the Tests of the Proximate Determinants of Fertility Model: Results of Case Studies and Quantitative Analysis in South Korea and the United States

Country	Proximate determinant	Trend identified in case study	Change to index implied by case study	Change in index observed from 1960s/70s to 2000s	Mismatch?
South Korea	Marriage	Women are marrying later and at a decreased rate.	Decrease	Increase	Yes
	Postpartum Infecundability	The duration of breastfeeding has undergone a sharp decline.	Increase	Increase	No
	Contraception	There has been a dramatic increase in contraceptive utilization.	Decrease	Decrease	No
	Induced Abortion	The rate and number of induced abortions has declined considerably.	Increase	Decrease	Yes
United States	Marriage	Women are marrying later, at a decreased rate, and with a higher incidence of dissolution.	Decrease	Decrease	No
	Postpartum Infecundability	More women are initiating breastfeeding, with a slight increase in the percentage doing so long enough to have an impact on fertility.	Decrease	Decrease	No
	Contraception	There has been a slight increase in contraceptive utilization, with a more notable increase in the usage of modern methods versus traditional ones.	Decrease	Slight increase; no significant change	Maybe
	Induced Abortion	The rate and number of induced abortions has increased considerably since the data were collected for Bongaarts' analysis, which was prior to the 1973 legalization of abortion.	Increase	Increase	No

indicating where the various “mismatches” were found to occur.

The first mismatch dealt with the marriage determinant. For both South Korea and the United States, the data indicate that women began to marry later and at a decreased rate between the 1960s/70s and the 2000s. This should technically have decreased the index of marriage, since lower values represent that fewer women are married and subsequently exposed to sexual relations and the risk of pregnancy. While this was the case for the United States, the index of marriage was shown to actually have *increased* in South Korea, corresponding to a *greater* number of women in such relationships and an ultimately a *lower* inhibiting effect on fertility.

It is particularly puzzling that the model would correctly represent one country and not the other; after all, both experienced an increase in the median age at marriage, a higher proportion single by age, and a significant rise in the rate of marital dissolution. The most significant difference between the two nations with respect to marriage behaviors is pre-marital sexual activity; such behavior is normative in the United States but non-normative in South Korea. Thus, it seems logical to try to tie the inability to accurately represent changes over time in the proportion married in South Korea with this major difference. That is, is there something about Equation 2, which provides the calculation for the index of marriage, which performs more accurately in an environment with significant non-marital fertility than in one with primarily marital fertility? After all, in the case of the United States, there is a lower age-specific proportion married than in Korea after age 24, but higher age-specific fertility. By employing Equation 2, where the age-specific fertility and marriage rates are multiplied, a higher proportion of births

is left attributed to the unmarried, and thus not included in this calculation, than in South Korea. Yet it has already been established that the majority of births in South Korea are believed to occur within marriage. Furthermore, even if the index of marriage moved in the appropriate direction for the United States, it does not necessarily follow that the index of marriage per se is a good determinant of overall fertility in today's day and age. After all, the estimated TFR for the 2000s was 20 percent lower than the observed TFR for the same time frame. It seems extremely likely that changes in marriage behaviors in the United States would result in the proportion married being a more accurate indicator of the Total Marital Fertility Rate rather than the TFR, and most certainly contributing to this 20 percent discrepancy. In other words, the measure of "marital fertility" is likely no longer capturing the proportion of all births that it once was, since now a significant number of births are occurring outside of marriage, to singles or to cohabiting couples. Yet when considering that, even despite this, the data from the case study and quantitative analysis supported each other, it suggests that the model is actually working inefficiently for *both* countries. Regardless, it does not contribute to a possible explanation for why.

Accordingly, the most immediate possible improvement to the proximate determinants model would be to attempt the same kind of quantitative analysis portion, but with a measure of sexual exposure for all women aged 15 to 44, as opposed to just married women—much as Stover (1998) has already suggested. Unfortunately, accurate measures of sexual exposure are not yet commonly collected for most countries.

The second mismatch was identified for the induced abortion determinant. In

South Korea, though the rate and number of induced abortions underwent a considerable decline, this did not result in an increase in the index of induced abortion; instead the empirical analysis in South Korea showed a negative association. The index underwent a decrease, implying that more abortions are taking place, and the inhibiting effect on fertility has increased. This was a very surprising result, considering that the measurement of this index, as illustrated Equation 4, seemed likely to hold up against change. If the total abortion rate (TA) decreased over time, which it did for both countries, this should decrease the denominator of the equation, thus increasing the quotient, with the larger index ultimately representing a decreased inhibiting effect of induced abortion on fertility. Because this is not what happened, it suggests that either the value for b in the equation, the component representing the number of births averted per each abortion, or the relationship between the TFR and the TA have evolved. In the first case, for the index of abortion to *increase* as it was expected to, the value for b would need to decrease. However, let's assume hypothetically that due to contraceptive saturation, getting an abortion averts just slightly less than a full birth: perhaps women who go through the process of having an abortion are eager to avoid the experience again, and are especially careful to use effective methods of contraception in future sexual encounters. If the number of births averted for each abortion is 0.99, then the equation for b becomes $b = 0.495(1 + u)$. In this equation, it is implied that 0.495 births are averted in the complete absence of contraception. Yet there is nothing about contraceptive saturation that suggests the rate suggested by Bongaarts and Potter of 0.4 births averted in the *absence* of contraception should increase. As a result, it is entirely

possible that a new mathematical relationship between contraceptive prevalence and the number of births averted per abortion needs to be revised.

In the second case, I am suggesting that perhaps the relationship between the TFR and the TA has evolved. That is, perhaps the mathematical relationship identified in Equation 4 is different in instances of low fertility. In fact, it seems circular to me to employ the TFR at all in an equation whose result is ultimately utilized to estimate the TFR. As a result, I would suggest developing an index of induced abortion that is entirely independent of the observed total fertility rate; that is, I would argue that we need an index that represents the effect of induced abortion on fertility without relying on a current measure of fertility. Whether it is possible to develop such an equation is a subject for future research.

Even though the remaining two determinants, postpartum infecundability and contraception, did not exhibit contradictory trends between the case studies and quantitative analysis, it should not be taken for granted that the proximate determinants model is working as it was intended to. For example, in the case of postpartum infecundability, the estimated relationship with the fertility level represented by Equation 5 is contingent upon a number of factors. In order to establish the value of the index for a population, Bongaarts and Potter identified the length of the birth interval if no breastfeeding or postpartum abstinence were practiced: the 20 month interval consists of 1.5 months of minimum postpartum anovulation, 7.5 months of waiting time to conception, 2 months to account for spontaneous intrauterine mortality, and 9 months for a full-term pregnancy (1983: 86). If any of these components have changed over the

past several decades—that is, if the waiting time to conception is shorter on average, if women are typically delivering later or earlier on average, and so forth—then the calculation of this index needs to be adjusted. Consequently, postpartum infecundability may still be an effective determinant of the fertility level, but perhaps not as effective; it may, indeed, be contributing to the portion of the TFR left unexplained. Further, more biologically-based research could investigate the length of this birth interval for the purposes of revising Equation 5.

Then, though the changes in the index of contraception closely mirrored contraception as represented in the case studies, one could still well question the accuracy of its representation of contraception effectiveness in the United States. That is, whereas the overall usage of contraception only increased minimally from 0.72 in 1967 to 0.729 in the 2000s, the usage of *modern*—i.e. more effective—methods increased 42.1 percent, from 48.2 percent in 1973 to 68.5 percent in 2002. Theoretically, this increase in the utilization of more effective methods should translate into less contraceptive failure and, accordingly, an increase in the inhibiting effect on fertility. That is, the index of contraception should have undergone at least a slight decrease, as opposed to the negligible increase it experienced. The fact that a 42.1 percent increase in the usage of modern methods does not resonate in a more than negligible increase in the index of contraception suggests that this is another area that may be contributing to the unexplained portion of the observed TFR.

An additional component that should be addressed is the value of 1.08 in the calculation of the index (see Equation 3). This value is an adjustment that represents the

fact that women who know or believe that they are sterile do not use contraception, causing the practice of contraception to become concentrated among *nonsterile* couples. Essentially, u is inflated by this sterility correction factor to take into account this concentration of contraception (Bongaarts and Potter 1983). This constant was estimated directly from data from 30 years ago on the proportion of women in a number of countries who believed that they were nonsterile. Today, the number may be lower due to the higher prevalence of surgical sterility and sterility resulting from sexually transmitted infections and/or HIV/AIDS. In either case, this too needs to be reevaluated with more recent data.

Furthermore, even though the index of induced abortion appeared to accurately portray the case of the United States, this may not actually be the case. The number of abortions in the United States has undergone a considerable overall decline since the 1970s. However, Bongaarts' calculations were based on 1967 data, which was over five years prior to the legalization of abortion in the United States in *Roe v Wade* in 1973. As a result, barring the presence of illegally obtained abortions, the index value of 0.999 seems relatively reasonable at first. If we were to examine a value for this index shortly after 1973, it would certainly be much lower than the values in both 1967 and 2006, meaning that the trend between this period and the 2000s seems to be accurately represented. Yet when the value of the 1967 index of abortion of 0.999 is considered side-by-side with the total induced abortion rate (i.e. the number of induced abortions per woman at the end of the reproductive period if induced abortion rates remain at prevailing levels throughout the reproductive period) of 1.08, it seems slightly suspect;

how could the inhibiting effect of induced abortion on fertility be so minimal, when the hypothetical number of abortions each woman could expect by the end of her reproductive period based on current levels is greater than 1?

For this reason, I decided to re-calculate the index of induced abortion according to Equation 4 with the data supplied by Bongaarts and Potter (1983) (see Table 18). By substituting the 1967 values for the TFR, u , and TA into the equation, I was very surprised to produce a value of 0.759 for the index of induced abortion, as opposed to the 0.999 indicated by Bongaarts and Potter. Such a discrepancy could well mean a number of things; for instance, Bongaarts and Potter may be operating under certain assumptions that they did not elucidate. Perhaps based on the legal status of abortion in 1967, they deemed it unnecessary to account for illegally obtained abortions in the final index, even though they may have been included in the total induced abortion rate. Regardless of the reason, if this alternate value for the index of abortion was inserted into the model, the trend for the United States would still typically follow that identified by the case study, offering no additional insight into its limited effectiveness in South Korea.

Ultimately, the proximate determinants model does not offer a clean picture of the fertility level in either South Korea or the United States. However, that is not to say that it offers no insights into fertility, or that it is no longer a useful tool. On the contrary, the proximate determinants model holds considerable potential for the analysis of low fertility countries, provided that the kinds of limitations encountered in this dissertation can be addressed. These limitations are considered in the next section.

Limitations and Future Research

It would not be fair to critique an application of the proximate determinants model without identifying the limitations personally acknowledged by Bongaarts and Potter. After all, as Knodel and his colleagues point out in their treatment of the model, several of the calculations employed “require that a variety of assumptions be made in order to convert the observed data into measures” (1987: 96). Bongaarts and Potter have identified a list of assumptions which may, when combined, account for the degree of variance left unexplained by the proximate determinants, including the following:

- (1) Errors in the measurement of the proximate determinants;
- (2) Errors in the specification of the model;
- (3) Deviations from the total fecundity level (TF) of 15.3. Bongaarts and Potter explain that “the TF is a function of the three proximate determinants not explicitly included in the model (i.e., natural fecundability, intrauterine mortality, and the prevalence of permanent sterility). As a consequence, the assumption that $TF = 15.3$ is only an approximation” that reflects the “normal” range of TF of from 13 to 17 births per woman; and
- (4) Errors in the observed TFRs (1983: 92).

Yet even in consideration of these limitations and others, Knodel and his colleagues emphasized that “rough estimates are possible,” provided that the assumptions above are reasonable (1987: 96).

In addition to these limitations built into the proximate determinants model, my research included a number of limitations of its own, generally having to do with data

availability. For example, of the data I was able to compile for the two countries in my investigation, there is a significant limitation in that not all the data could be collected for the same year. Considering that slight changes in the components of each quantitative index can translate into significant differences in the resulting estimated TFR, this could well have had an effect on the overall empirical legitimacy of the model; it is possible that the estimated TFR is either too high or too low. Similarly, the data used to calculate each index came from a wide variety of secondary sources, which introduces an array of possible uncertainties ranging from differences in methods of data collection, to a lack of fit between the concepts measured in the original studies from which I drew data and the concepts serving as the focus of my investigation.

Additionally, insofar as limitations regarding the usefulness of case studies may be concerned, it must be considered that in many ways, the experiences of the United States with regards to fertility levels have differed substantially from those of South Korea, as well as virtually all of its developed, post-industrialized peers. Yet it is of great importance to note that the United States is a very heterogeneous country in terms of race, ethnicity, religious affiliation, educational attainment, and more. Lesthaeghe and Neidert have insisted that there is “even more variation within [U.S.] borders than within the EU-25” and that the experiences of ethnic minorities—especially the Hispanic population, believed by Lesthaeghe and Neidert to be still in the process of completing the first demographic transition—“statistically distort the picture for most of the other segments of the population” (2006: 671-672). Specifically, they explain:

That the American total fertility rate is close to 2.0 is the result of the following circumstances. Although non-Hispanic white fertility dropped below

replacement, it stayed in the vicinity of 1.8, and that was high enough for the contribution of the Black and especially of the Hispanic population, which together form about a quarter of the U.S. population, to raise the TFR of the United States as a whole to replacement level... Hence, the ethnic factor is important in maintaining the overall American TFR around replacement level. In effect... immigration and higher immigrant fertility compensate for sub-replacement fertility of much of the native population (2006: 693-694).

In this context, it makes sense that a fertility model that accounts for the total fertility rate via numbers representing the behaviors of the entire population would be less effective in a racially and ethnically diverse population.

Even these issues exist within the context of data limitations. Initially, the two case studies were intended to set the stage for a much broader macro-level investigation that would have essentially reproduced the 1982 Bongaarts study of developing, developed, and historical populations with exclusively below-replacement fertility nations. This entailed obtaining data for all the components necessary to calculate each quantitative index for as many below-replacement fertility nations as possible. Finding these measures for the 74 countries I had identified as having average 2006 to 2008 TFRs below 2.1 proved to be an insurmountable challenge. Most notably, the average duration of breastfeeding was discovered to be rarely available for developed nations, preventing the calculation of the index of postpartum infecundability. For contraceptive prevalence, whereas data referring to 1985 or later are available for 170 of the over 190 countries in the world, only 109 countries have data for as recently as the year 2000, representing 85.8 percent of women of reproductive age in a marriage or consensual union (United Nations Population Division 2008); of these, only 41 are below-replacement fertility nations with contraceptive prevalence data only for the majority of

contraception types, placing another significant limitation on the possible coverage of a macro-level analysis of this type. Additionally, data were only available for 51 countries for the index of marriage and for 36 countries for the index of abortion.

Had I been able to run the proximate determinants model with a sufficient number of below-replacement fertility nations, I still may have been prevented from accomplishing the greater intent of this dissertation: respecifying the model in an attempt to explain over 90 percent of the variation in below-replacement fertility. To accomplish this would have necessitated identifying more accurate measures of the determinants, and then gathering the appropriate data and testing the model on as many countries as possible. For example, instead of limiting the model to married women as was done in Bongaarts' original analysis, the results of my investigation suggested that extending the model to all women of reproductive ages would likely explain a greater proportion of variation in fertility. However, in many countries—even among developed nations—much of the data relating to reproductive health and pregnancy are still collected for married women only.

Subsequently, for a modern, macro-level analysis of below replacement nations in the style of Bongaarts' original investigation to have been conducted, there needs to be a widespread international effort to encourage nations—and especially developed nations—to collect more comprehensive fertility data for all women. The knowledge that stands to be gained from such an endeavor is well worth the likely cost. As Morgan and Taylor point out, the fertility-related concerns “facing Greece, Italy, and Spain are very different from those facing France and Australia. For the latter two countries,

moderate levels of immigration could offset sub-replacement fertility, producing population stability. For Greece, Italy, and Spain, only massive immigration could offset their very low fertility” (2006: 377). What their point highlights is the fact that differences among low TFRs are important: even little differences can have a striking influence on the shape of a country’s future. Accordingly, it is critical to develop an effective model of below-replacement fertility. When it is considered that many of these nations already have fertility surveys of a national scale in place, it becomes a matter of simply ensuring that the “right” questions are asked to make the reproduction and respecification of this model a possibility.

Implications for Public Policy

In 2003, S. Philip Morgan asserted that low fertility is not a twenty-first century crisis—at least, not yet. Instead, he described it as:

...a genuine problem, but the kind of problem we want to have. That is, it is the result of solving a bigger, more threatening social problem: the crisis of continued population growth. Low fertility is also a problem that can be addressed through public policy and institutional adjustments. Finally, low fertility is a problem that befalls developed countries that, by and large, have the resources to respond (600).

What is particularly notable about his declaration is the belief that “public policy and institutional adjustments” are capable of addressing this problem—especially because he makes no specific mention of *pro-natalist* policies. After all, research suggests that even “abrupt and sustained” increases in fertility rates won’t affect the supply of workers for at least *fifteen* years and would not factor into an altered ratio of the working age population to the elderly for at least *fifty* years, so other considerations and/or solutions are absolutely

necessary in the meanwhile (Bermingham 2001: 359). This suggests that countries will need to be more creative than simply asking women to have more babies for some kind of reward. Instead, it would be beneficial for countries to concentrate on a combination of immigration policies and economic restructuring in anticipation of what very well may occur. After all, there is much to be said for the benefits of smaller populations, at least in certain parts of the world. When the widespread lack of success met by most pro-natalist policies is taken into consideration, it would seem to be worthwhile for countries to identify what would be the smallest functional population in their particular circumstances (Bouvier 2001), and what kinds of changes would be necessary to make that population sustainable.

One such change might include addressing a significant fear related to declining fertility, introduced in Chapter II: the shrinking working-age population and the resulting lack of support for the older, retired populations. One promising solution to this problem is to tap what Coleman calls the “hidden labor supply” (1992: 435), that is, the economically inactive, including many women (especially married women), teenagers, and the healthy elderly. After all, high unemployment rates suggest that there is, in fact, a ready and waiting supply of people. Certain historical evidence, on the other hand, does not bode well for this plan. Japan is the best example of a country that attempted to supplement its labor population with females, the elderly, and rural workers rather than resort to employing immigrants. While Japan’s efforts were initially regarded as successful, by the end of the 1980s the nation was still faced with a severe domestic

labor shortage and the need to reevaluate its immigration policies (Cornelius et al. 1992: 439-440).

Of course, based on its original commitment to using an *entirely* native workforce, Japan might be classified as a unique situation. The lesson that may be taken from Japan's experiences is that as shortages in particular sectors are anticipated or identified, policies to filter underutilized laborers into these areas should be developed in conjunction with other efforts, such as admitting immigrants whenever possible and even restructuring the economy. Anything reminiscent of a solution is going to result from a combination of different endeavors, and other countries may find greater degrees of success in expanding their labor force by utilizing distinct combinations of economic, social, and immigration policies. Mitra Toossi, an economist at the Bureau of Labor Statistics, explains that labor force growth in the future can only stem from two causes: growth in the labor force participation rates of the different age, sex, racial, and ethnic categories, or growth in the actual populations of the different age, sex, racial, and ethnic categories (2006: 38). Insofar as producing the latter effect is concerned, only increases in fertility and immigration rates seem to be relevant. Yet the many means of increasing labor force *participation* speak directly to Coleman's hidden labor supply; for example, increasing the participation rate of the young, of women, of the older workforce, and of the unemployed and underemployed across all social categories.

Though such a plan is logical—getting more of the people that are already available working, thus improving the rate of dependency and decreasing the need to rely on imported labor or potentially unsuccessful fertility initiatives—its realization is

multidimensional, and an extremely complex undertaking. For instance, consider how this might play out in the United States. To increase the participation of the older workforce, the obvious solution would be raising the retirement age. The underlying problem an aging population faces is an insufficient number of laborers to generate enough funds to support the older, non-working population. Raising the retirement age addresses this directly in three ways:

First, since people will have to work longer before receiving full benefits, they will also have to pay taxes longer. Second, workers will receive full benefits later in life and, hence, receive fewer total benefits. And finally, as the retirement age is pushed back, fewer people will reach it, reducing the number of people who will ever see benefits at all” (Weller 2002: 76-77).

What this does not address is the fact that people are not generally willing and ready to work additional years, especially since many individuals already choose to retire before the official age. Furthermore, Weller argues that “great disparities among different demographic groups in the U.S. workforce” allow an increase in the retirement age to be “most burdensome for those who depend on social security the most” (2002: 80, 84). That is, groups like African Americans, the poor, blue-collar workers, and workers with less education will be “hit harder” by an increase in the retirement age because they have shorter life expectancies to begin with. Some workers may even be forced to retire early due to deteriorating health conditions, and will suffer significantly decreased benefits as a result (Weller 2002: 81). Consequently, expanding labor force participation this way supposedly benefits all of society, but at the expense of certain disadvantaged groups.

If not with the older workforce, would the U.S. have better luck encouraging the unemployed to “pick up the slack”? This is problematic on several levels. For instance, the

unemployed are not equally dispersed across the society; particular groups (such as women, minorities, and those with lower educational attainment) are far more likely to fall into this category. If they were to enter the work force, many of them would likely end up employed in the service or sales sectors. However, a decreased work force does not only mean decreases in those occupations; there will be a need for skilled labor as well, a need to fill positions requiring lots of education and training. Thus, getting the unemployed to work may not necessarily supplement the labor force in the necessary places. If desperate enough, this could mean widespread retraining with employers footing the bill. Yet all of this assumes that most of the unemployed are actively seeking jobs. Many may feel disenfranchised, disillusioned, and discouraged. Others may feel pessimistic about job prospects based on the low wages available to them. Feeling perhaps that no one is working to support them, persuading such individuals to work to improve the nation's support ratio is not likely to resonate. One possible encouragement could be increasing the minimum wage. Results presented in a recent Congressional Research Service report reveal that "a higher minimum wage may raise [low-wage workers'] incomes and it may encourage greater labor force participation among members of low-income families" (Low-Wage Workers 2007: 73). In fact, the report goes on to state that an estimated 21.9 percent of workers in near-poor families and 32.7 percent of workers in poor families stand to benefit from such an increase. This could certainly aid in abating negative feelings toward the workforce.

With regards to increasing the female participation in the labor force, this is an area with real potential. While the U.S. has witnessed a considerable increase in this rate since the 1970s, some studies have projected that it has "already reached its peak" (Toossi 2006:

39). A likely strategy for continuing to encourage women to enter or reenter the labor force would involve the development of policies designed to ease the burden of balancing a family and a career; these would involve affordable daycare, extra personal days to care for sick children or aging parents, maternity and paternity leave, and so forth. While such policies would certainly increase the labor force participation rate of women, the obstacle here is money. Without the means to subsidize daycare costs or without corporations willing to make allowances for parents, these policies simply are not possible. Another less likely tactic is to develop policies aimed at reducing the gender gap in wages. This is complicated based on the fact that a primary reason women still earn so much less than men is because of sex segregation in the labor market, or women being “funneled into ‘female jobs’” (Verdugo 2006: 563). This type of work, also referred to as “pink-collar jobs,” has considerably lower levels of pay and prestige. Yet halting such practices, as Verdugo recommends, would entail major structural changes to society, the sorts of changes that would probably take a very long time. By that point, any problems due to a labor shortage or support ratio imbalance may well have already manifested themselves and possibly have been addressed in different ways.

Other Western countries might likewise face the difficulties I have outlined or hypothesized for the U.S. Conversely, they may not be due to their unique political or socio-cultural context. Ultimately, it remains to be seen if there *is* a way to successfully restructure the economy and society of a nation so that more of the potential workers it already has are employed, or to eliminate the need for some workers in certain industries so they can be filtered elsewhere. If it is possible, a declining population may not be the

dramatic problem it is made out to be. However, based on the complexities described above, this appears to be much easier said than done.

Ultimately, Morgan and Taylor remind us that “both the current prevalence of low fertility and its persistence are unprecedented” (2006: 377). This means that to address this issue will require considerable time and effort on the part of politicians, government officials, and everyday individuals. Comprehensive research in the area of low fertility can aid in the process of adjustment by providing additional information with which nations can determine how best to adapt to their new demographic reality. Thus, while many societies of the world certainly face a major challenge on their horizons, they do not face this challenge without tools to aid them, and they do not face it alone. If history is any example, societies will adapt to their below-replacement fertility future and—in some form or another—they will go on.

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APPENDIX A

Contraceptive Effectiveness Rates (Percentage of Women Not Experiencing an Unintended Pregnancy During the First Year of Use) According to Use Effectiveness.

Method	Use Effectiveness
Calendar Rhythm	0.75
Combined Pill & Mini-pill	0.92
<i>Injectables</i>	0.97
Depo-Provera	0.97
Lunelle	0.97
<i>Intrauterine Device (IUD)</i>	0.9955
ParaGard	0.992
Mirena	0.999
Male Condom	0.85
Sterilization (Female)	0.995
Sterilization (Male)	0.9985
Withdrawal	0.73

*Use effectiveness derived from measure for all fertility awareness methods, which also includes the “ovulation method” and “standard days.”

Data adapted from Trussell 2004 and 2007.

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